



# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Ecological Services  
764 Horizon Drive, Building B  
Grand Junction, Colorado 81506-3946

IN REPLY REFER TO:  
ES/GJ-6-CO-03-F-012  
MS 65412 GJ

September 16, 2003

Peter L. Clark, Forest Supervisor  
Rio Grande National Forest  
1803 West Highway 160  
Monte Vista, Colorado 81144

Dear Mr. Clark:

This document transmits the Fish and Wildlife Service's (Service) final biological opinion based on our review of the proposed Forest Plan Amendment to the Revised Land and Resource Management Plan for the Rio Grande National Forest located in Saguache, Hinsdale, Mineral, Rio Grande, and Conejos counties, Colorado, and its effects on the threatened Canada lynx (*Lynx canadensis*), bald eagle (*Haliaeetus leucocephalus*), Mexican spotted owl (*Strix occidentalis lucida*), Uncompahgre fritillary butterfly (*Boloria acrocnema*), and the endangered southwestern willow flycatcher (*Empidonax traillii extimus*). Your April 21, 2003, letter requesting consultation on the effects of the proposed Plan Amendment on the above listed species was received in our office on April 23, 2003. This biological opinion was prepared in accordance with section 7 of the Endangered Species Act (16 U.S.C. 1531 *et seq.*).

The Service concurs with your "may affect, not likely to adversely affect" determinations for the threatened bald eagle, Mexican spotted owl, Uncompahgre fritillary butterfly, and the endangered southwestern willow flycatcher.

In your biological assessment, you made a "not likely to jeopardize the continued existence" determination for the proposed mountain plover (*Charadrius montanus*). On September 9, 2003, the Service published a final rule, which determined that the action of listing the mountain plover as threatened, pursuant to the Endangered Species Act of 1973, as amended (Act), is not warranted, and we consequently withdrew our proposed rule and our proposed special rule. We made this determination because threats to the species as identified in the proposed rule are not as significant as earlier believed, and current available data do not indicate that the threats to the species and its habitat, as analyzed under the five listing factors described in section 4(a)(1) of the Act, are likely to endanger the species in the foreseeable future throughout all or a significant portion of its range. Therefore the mountain plover will not be further addressed in this document.

As you may already know, the District Court for the District of Columbia issued an order on December 26, 2002, that enjoins the Service from issuing any written concurrence[s] that actions

proposed by any Federal agencies “may affect, but are not likely to adversely affect” the threatened Canada lynx. Until further notice, all consultations concerning effects to the Canada lynx must be conducted in accordance with the direction of the Court. Specifically, any actions subject to consultation that may affect the Canada lynx require formal consultation as described in 50 CFR 402.14 and preparation of a biological opinion that addresses how the proposed action is expected to affect the Canada lynx in order to complete the procedural requirements of section 7 of the Endangered Species Act.

This biological opinion is based primarily on our review of your April 21, 2003, biological assessment (BA) regarding the effects of the proposed action on the Canada lynx. A complete administrative record of this consultation is on file at this office.

### **Consultation History**

Biological assessment for the Rio Grande National Forest Revised Land and Resource Management Plan (1996) and Service concurrence of “may affect, not likely to adversely affect” to all species (November 6, 1996).

Biological assessment for the Prescribed Fire Plan EA (1997) and Service concurrence of “no effect” to the southwestern willow flycatcher and of “may affect, not likely to adversely affect” to the Mexican spotted owl (January 19, 1997).

Updated biological assessment for the Prescribed Fire Plan EA (2002) and Service concurrence of “no effect” to the Uncompahgre fritillary butterfly and of “may affect, not likely to adversely affect” Canada lynx (September 19, 2002). As part of that BA, a screen was developed to assist biologists in project-specific analysis of effects to lynx, to track cumulative changes by Lynx Analysis Unit (LAU), and to provide direction on incorporating mitigation measures. Individual projects may still require consultation.

Biological assessment of programmatic outfitter and guide special user permit renewals on the Rio Grande National Forest (2002) and Service concurrence of “may affect, not likely to adversely affect” all species (September 4, 2002).

Biological assessment for Developed Site - Deferred Maintenance Projects on the Rio Grande National Forest (2002) determination of “no effect” to all species except Canada lynx, which was screened for programmatic concurrence of “may affect, not likely to adversely affect” (September 9, 2002).

Biological assessment for Forest Developed Recreation Site Maintenance Activities on the Rio Grande National Forest (2002) determination of “no effect” to all species except Canada lynx, which was screened for programmatic concurrence of “may affect, not likely to adversely affect” (September 9, 2002).

Biological assessment for Programmatic - Minor Recreation Special Use Permit Issuances on the Rio Grande National Forest (2002) and Service concurrence of “no effect” to Uncompahgre fritillary butterfly and of “may affect, not likely to adversely affect” to all other species (September 23, 2002).

Biological assessment for Trail Maintenance Activities on the Rio Grande National Forest (2002) and the Service concurrence of “no effect” to Canada lynx and of “may affect, not likely to adversely affect” all other species (October 11, 2002).

Programmatic biological assessment/biological evaluation for Small Sales and other Forest Products on the Rio Grande National Forest (2001) determination of “no effect” to all species except Canada lynx, which was screened for programmatic concurrence of “may affect, not likely to adversely affect” (July 25, 2001).

### **Canada Lynx**

Biological assessment of the Effects of National Forest Land and Resource Management Plans and Bureau of Land Management Land Use Plans on Canada lynx (1999) and the Service’s biological opinion of “may affect, likely to adversely affect” (October 25, 2000).

Canada Lynx Consultation Agreement in Colorado between the U. S. Fish and Wildlife Service and the Forest Service Rocky Mountain Region (May 30, 2000).

Reauthorization of Canada Lynx Consultation Agreement in Colorado between the U. S. Fish and Wildlife Service and the Forest Service Rocky Mountain Region (June 4, 2001).

### **Southwestern Willow Flycatcher**

Biological assessment for the Southwestern Willow Flycatcher - Need for Evaluating Grazing Allotment Operating Plans (1995) and Service concurrence of “may affect, not likely to adversely affect” (September 15, 1995).

1997 Addendum to the 1995 biological assessment and Service concurrence of “may affect, not likely to adversely affect” (July 17, 1997).

### **Uncompahgre Fritillary Butterfly**

Biological assessment for the Uncompahgre Fritillary Butterfly Range Permit Reissuance with a determination of “no effect” (July 7, 1995).

## **BIOLOGICAL OPINION**

### **DESCRIPTION OF PROPOSED ACTION**

#### **Background**

Regional Forester Elizabeth Estill signed the Record of Decision for the Revised Rio Grande National Forest Land and Resource Management Plan (Forest Plan) on November 7, 1996. The Rio Grande National Forest received several appeals of the Forest Plan and its accompanying Final Environmental Impact Statement (FEIS), one of which was from Colorado Environmental Coalition (CEC) *et al.* On January 19, 2001, the Chief of the Forest Service rendered a decision on CEC’s appeal. On March 29, 2001, the Deputy Under Secretary for the Department of

Agriculture's Natural Resources and Environment, completed a discretionary review of the Chief's decision on the appeal. The Deputy Under Secretary affirmed in part and reversed in part the Chief's decision on the appeal and provided a new set of instructions to complete the Forest Plan. These included instructions to add to the record the scientific literature citations used to determine habitat needs, distribution, and trends of sensitive species and management indicator species. The current update of the Forest Plan's biological assessment and biological evaluation (BE) will, in part, address these instructions.

The BA and BE for the Forest Plan were completed and signed on October 18, 1996 (FEIS Appendices page F1-F23). The BA determined that any of the Forest Plan alternatives "may affect, are not likely to adversely affect" any of the listed species. The BE determined that any of the Forest Plan alternatives "may adversely impact individuals, but are not likely to result in a loss of viability in the Forest Planning Area, nor cause a trend to Federal listing or a loss of species viability range-wide." Subsequent to the adoption of the Forest Plan, the status of some of the species changed. The Canada lynx was listed as threatened, the Gunnison sage grouse has been proposed as a candidate species, and the peregrine falcon has been delisted.

The Service listed the lynx as threatened, effective April 24, 2000 (65 FR 16051). The Service concluded the chief threat to the lynx in the contiguous United States was the lack of guidance to conserve the species in Federal land management plans. Formal consultation, as required by the Endangered Species Act (ESA), was completed on October 25, 2000, when the Service issued its biological opinion (BO) on the Programmatic Assessment of the Effects of National Forest Land and Resource Management Plans and Bureau of Land Management Use Plans on Canada Lynx (Hickenbottom et al. 1999). In the BO, the Service concluded that Forest Plans as implemented in conjunction with the Conservation Agreement (U.S. Forest Service and U.S. Fish and Wildlife Service, Feb. 7, 2000) are not likely to jeopardize the continued existence of the lynx. The Service's no jeopardy conclusion for National Forest System lands is based upon continued implementation of the Conservation Agreement (CA) until such time that Forest Plans are amended or revised to consider the needs of lynx.

The Service, in response to the December 26, 2002, memorandum opinion and order of the United States District Court for the District of Columbia, in the case of *Defender of Wildlife v. Norton* (Civil Action No. 00-2996 (GK)) and pursuant to the Endangered Species Act of 1973, as amended, provides a clarification to the finding we made in support of the final rule that listed Canada lynx as threatened (68 FR 40076). As a result of our reanalysis of the basis for the final rule, which was directed by the Court, we found that the lynx is not endangered throughout a significant portion of its range. The finding did not affect the status of the lynx as set forth in 50 CFR 17.11; the lynx continues to be listed as threatened as a distinct population segment.

The Service proposed the Gunnison sage grouse as a candidate species on December 29, 2000 (65 FR 82310). Under the August 30, 2000 *Memorandum Of Agreement Endangered Species Act Section 7 Programmatic Consultations and Coordination among Bureau of Land Management, Forest Service, National Marine Fisheries Service and Fish and Wildlife Service* (MOA), the Forest Service agreed to confer with the Service on the review of effects of programmatic actions on candidate species. This MOA outlines guidance and procedures for section 7 consultations as well as consideration of candidate species conservation in Forest Plans and other programmatic level proposals prepared by the Bureau of Land Management (BLM)

and Forest Service. The scope of this MOA includes Land and Resource Management Forest Plans prepared by the Forest Service pursuant to the National Forest Management Act of 1976 [16 U.S.C. 1601-1614] and Resource Management Forest Plans and Management Framework Forest Plans prepared by the BLM pursuant to the Federal Land Policy and Management Act of 1976 [43 U.S.C. 1701-1784].

The peregrine falcon was delisted August 25, 1999 (64 FR 46541). The Service proposed a monitoring plan on July 31, 2001 (66 FR 39523) and extended the comment period on September 27, 2001 (66 FR 49395). A draft post-delisting monitoring plan was made available in November 2002 for State and cooperator review and a draft cooperator use copy was made available in March 2003, pending final signature. The plan fulfills the final process of species recovery, as outlined in section 4(g)(1) of the ESA, which requires that the Service "...implement a system in cooperation with the States to monitor effectively for not less than five years the status of all species which have recovered to the point at which the measures provided pursuant to this Act."

All of this new information has been incorporated into an update of the Forest Plan's BA and BE, in response to the Deputy Under Secretary's instruction that the Forest Plan modify the existing viability analysis to correct the following identified deficiencies:

Management indicator species (MIS) were not identified, which does not meet the plain language requirements of 36 CFR 219.19.

Inadequate analysis was conducted relating to species referred to in the FEIS (pages F 20-23) as the "Riparian Group" and the "Nonforested Group."

No map of rangeland for which livestock grazing permits has been issued.

Habitat effects were displayed for only 10 years following adoption of the Revised Forest Plan.

Cursory references were made to the scientific literature regarding habitat needs, distribution, and population trends of sensitive species.

Specifically, the Deputy Under Secretary instructed the Forest to make the following corrections:

Select appropriate MIS per 36 CFR 219.19 and display the environmental effects of Forest Plan alternatives on such species.

Expand the display of environmental effects of Forest Plan alternatives on Riparian Group and Non-forested Group species to be commensurate with the display in the FEIS of effects on other Groups.

Display habitat effects for a longer time period, to be determined by the Forest based on consideration of rotation age and rate of change in Forest Plant communities due to succession or management activities. As part of the coarse-filter and fine-filter analyses contained in the FEIS, habitat/vegetation types should be forecast into the future to

ensure the persistence of these ecosystems. In addition, the disclosure of effects should include a better display of where management activities are permitted by habitat/vegetation type and management prescription.

Add direction to the monitoring in the Forest Plan if MIS are selected that the Revised Forest Plan does not already require to be monitored.

Add to the record the scientific literature citations used to determine habitat needs, distribution, and trends of sensitive species and MIS.

The Forest intends to meet the first, fourth and fifth items of direction through the formal selection of appropriate MIS as proposed in the Environmental Assessment (EA). The EA proposes to: 1) adopt MIS to assist the Rio Grande National Forest in analyzing and evaluating species viability; 2) incorporate the MIS into the Forest Plan and amend standards and guidelines as appropriate; 3) initiate additional monitoring and evaluation requirements related to the MIS to be used in evaluating species viability; and 4) add to the record the scientific literature citations used in the preparation of the MIS species assessments and evaluation documents, and in the update of the BA and BE.

Additional reports were completed in conjunction with the EA in order to address the remaining items of direction and provide precursory information for both the BA and BE. These reports include the following:

Expanded Habitat Effects Display Report (January 2003). This report expands the effects display of projected management activities on all affected habitats through a five-decade period.

Migratory Bird Supplemental Information Report (November 2002). This report evaluates the effects of the Forest Plan on migratory birds, as directed by Executive Order 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds).

MIS Effects Display Across Alternatives (March 2003). This report evaluates and displays the effects of all Forest Plan alternatives on the selected MIS using the expanded timeframes of the Habitat Effects Display Report.

Expanded Environmental Effects Display Report (in progress). This report will evaluate and display the effects of all Forest Plan alternatives on Forest sensitive species in riparian and non-forested habitats.

This biological opinion will focus primarily on the implementation of the Rio Grande National Forest Revised Land and Resource Management Plan (1996) and the interrelated action of implementing the Conservation Agreement (February 7, 2000).

The proposed management action considered in this opinion is the continued implementation of the revised 1996 Forest Plan with the amended MIS (alternative 2) as detailed above. The analysis of this action will examine the effects of amending MIS into the Forest Plan, adding standards and guidelines, and incorporating changes to the monitoring plan. The action area

includes the lynx habitat within the Rio Grande National Forest, adjacent habitat on other Federal ownerships especially Bureau of Land Management administered lands, and the 4 landscape linkages associated with the Forest.

The proposed action does not include conservation measures specific to lynx beyond the commitments of the CA. The Service is currently engaged in consultation with Region 2 of the Forest Service to amend Forest Plans within Colorado to include specific conservation measures for lynx.

Proposed actions in the Forest Plan may impact the primary needs of lynx and their habitat use. Expected effects specific to these actions are discussed below.

### *Timber Management*

The FEIS predicted an annual harvest level of 11 MMBF/yr, but actual harvest levels have been closer to 7-8 MMBF/yr (EA Appendix B Table B-1). The preponderance of harvest (94 percent) is expected to occur in Land Type Associations (LTAs) 1 and 13 (EA Appendix B Table B-2) and most of that harvest would be in structure class 5 (late successional forest). Depending on harvest method, there would be concomitant increases in earlier structural classes (Table 6) in the BA. The predominant harvest method would be shelterwood cuts or group selection, resulting in an increase in structure class's early successional vegetation and mature forest, with varying size areas and stages of vegetative regeneration.

In addition to harvest of LTAs 1 and 13 (Engelmann spruce), minor amounts of harvesting would occur in LTA 2 (Aspen), LTA 3 (White Fir and Douglas Fir), and LTA 5 (Ponderosa Pine and Douglas Fir). The FEIS analysis of predicted habitat change in response to timber management was updated with the *Expanded Habitat Effects Display Report (Forest Service, 2003)*. This report predicted a change in the late successional forested LTAs as  $\leq 1$  percent in the first decade and up to 14 percent by the fifth decade (Table 7, BA).

Additional harvest through limited thinning, mostly in lodgepole pine stands, or salvage sales for control of insects and disease may occur and firewood and post/pole sales will be by-products of timber harvest (FEIS page 3-171). Levels of these additional harvest activities are projected to be less than in the past, but as disease and bug infestations continue to escalate, more salvage sales than predicted are possible. Salvage harvest activities would be site-specific and target affected trees, limiting the size and scope of individual proposed harvests. Firewood collection is allowed across the Forest, as well as at slash removal sites, but is limited to within 300 feet of a road and not allowed within 100 feet of stream courses, riparian areas, wet areas, and bodies of water.

Harvest prescriptions include even-aged, uneven-aged and two-aged silvicultural systems, sanitation/salvage and limited thinning, with an emphasis on shelterwood and group selection harvests. Firewood removal and prescribed fire are used to treat the slash (FEIS Appendix K). These treatments will have a variety of impacts on lynx habitat, some of which will improve denning, dispersal and foraging habitat, some of which will have negative short-term impacts so that suitable habitat will become unsuitable for a relatively short period of time, and some will

have no impact since lynx habitat will not be entered. Many of the treatments will have short-term (20 to 100 years) impacts. Expected changes would include reduction in late successional forests and their snag components, primarily in spruce fir, with a light to moderate accumulation of coarse woody debris throughout harvested areas (FEIS 3-172). There would be patchy distributions of created openings, varying in size and stage of vegetative regeneration. Individual harvest prescriptions will require analyses at both the landscape and LAU levels to maintain habitat effectiveness (connectivity) and to ensure effects to lynx are minimized.

Timber management activities also include the construction and reconstruction of roads, which is expected to be minimal. Considering past budget experience, the Rio Grande National Forest projects 10 miles of new roads and 17 miles of reconstruction could occur, but not within roadless areas. Under a full budget, which is an unlikely scenario, 28 miles of new roads and 40 miles of reconstruction could occur, and within roadless areas (FEIS pages 3-361 and 3-439).

### *Fire Management*

The Forest Plan calls for the development and implementation of a prescribed fire program to address ecosystem needs and to reduce the risk of catastrophic fires (FEIS page 3-226). The fire management program emphasizes natural fuel management rather than activity fuel management, as it is anticipated that activity fuels created from timber harvest will be greatly reduced (FEIS page 3-236). The priority habitats for treatment will be those that are fire-maintained ecosystems (FEIS page 3-229) and include lower elevation mixed conifer and ponderosa pine, with some grasslands. The estimated acres of fuels treatments (1,200-3,000 acres average per year) were based on the ponderosa pine cover type, as it is most dependent on fire and has been dramatically affected by fire exclusion (FEIS page 3-235).

### *Recreation Management*

The Rio Grande National Forest manages for 2 major types of recreational opportunities; developed and dispersed recreation. There are 820 acres of developed recreation sites, and 51 summer homes, 3 resorts, 1 youth camp, 2 public use forest guard stations and 1 ski area on the Rio Grande National Forest (FEIS page 3-389). Dispersed recreation (motorized and non-motorized) accounts for 65 percent of forest recreation use and is widely distributed across the Forest, but concentrated along travel routes, lakes, streams or rivers and on snow (FEIS pages 3-389 and 3-414). Recreation use on the Forest is estimated to increase about 2-3 percent annually. This estimate is based on campground use records, various sample surveys taken to derive dispersed use throughout the Forest and skier visits received from Wolf Creek Ski Area, as displayed in the FEIS for Years 1990-1995 (pages 3-393-396).

### *Travel Management*

Travel management on the Rio Grande National Forest limits motorized travel to designated roads and trails. The Rio Grande National Forest prohibits off-road travel except for ATVs for game retrieval during hunting seasons and snowmobiles during the winter, outside of wilderness. Snowmobiling is normally confined to roads, trails and high country areas with low avalanche risk (FEIS page 3-433). Winter snowmobile trail and play areas have been mapped for the Rio Grande National Forest. All road management decisions will need to be informed through the



Roads Analysis Process (RAP), scheduled for completion during fiscal year 2004. That process includes consideration of wildlife values and effects to wildlife habitat, and will be facilitated by mapped winter use areas.

### *Livestock Management*

Rangelands on the Rio Grande National Forest are naturally fragmented and are characterized by narrow canyons with a riparian ecosystem and adjacent grassland communities intermingled with timberlands in the montane and subalpine zones and at lower elevations, are a mixture of grasslands, pinyon-juniper and ponderosa pine. There are 577,000 acres on the Rio Grande National Forest identified as suitable for livestock grazing (FEIS page 3-189 Table 3-46). Livestock grazing occurs in some lynx habitats, as rangelands are defined as grasslands, forb lands, shrublands, and those forested lands that support an understory of herbaceous or shrubby vegetation. Allotment Management Plans (AMPs) require periodic updating and are subject to National Environmental Policy Act (NEPA) and Endangered Species Act review and consultation. Until an AMP is updated, annual operating instructions (AOIs) incorporate both Forest Plan standards and guidelines and Lynx Conservation Assessment and Strategy (LCAS) conservation measures to implement management strategies designed to minimize effects to lynx habitat and to achieve Forestwide rangeland objectives.

### *Minerals Management*

Minerals management includes activities for development of leasable minerals, locatable minerals and salable minerals. These activities are predicted to be very limited in extent on the Rio Grande National Forest but may occur within lynx habitat.

This BO tiers to the October 25, 2000, BO, issued by the Service, where analysis is provided, in general, regarding the effects of implementation of current Forest Plans and implementation of the CA. At that time the Rio Grande National Forest Revised Land and Resource Management Plan (1996) had been completed, but as detailed above, new information regarding MIS is being amended to the Forest Plan.

## STATUS OF THE SPECIES /CRITICAL HABITAT DESCRIPTION

### *Species/Critical Habitat Description*

The lynx is a medium-sized cat with long legs; large, well-furred paws; long tufts on the ears; and a short, black-tipped tail (McCord and Cardoza 1982). The winter pelage of the lynx is dense and has a grizzled appearance with grayish-brown mixed with buff or pale brown fur on the back, and grayish-white or buff-white fur on the belly, legs and feet. Summer pelage of the lynx is more reddish to gray-brown (Koehler and Aubry 1994). Adult males average 10 kilograms (22 pounds) in weight and 85 centimeters (33.5 inches) in length (head to tail), and females average 8.5 kilograms (19 pounds) and 82 centimeters (32 inches) (Quinn and Parker 1987). The lynx's long legs and large feet make it highly adapted for hunting in deep snow.

Classification of the Canada lynx (also called the North American lynx) has been subject to revision. In accordance with Wilson and Reeder (1993), the lynx in North America is *Lynx*

*canadensis*. Previously the Latin name *L. lynx canadensis* was used for lynx (Jones *et al.* 1992; S. Williams, Texas Tech University, pers. comm. 1994). Other scientific names still in use include *Felis lynx* or *F. lynx canadensis* (Jones *et al.* 1986; Tumblison 1987).

In 1998, the lynx was proposed for listing as a threatened species under the Act (63 FR, July 8, 1998). The lynx in the contiguous United States was listed as threatened effective April 23, 2000 (65 FR 16052, March 24, 2000). The Service identified one distinct population segment in the lower 48 states. No critical habitat has been designated for the threatened population of Canada lynx in the contiguous United States. As explained in the final rule (65 FR 16052, March 24, 2000), designation of critical habitat would be prudent, but has been deferred until other higher priority work can be completed within the Service's current budget.

## Life History

**Home range and dispersal** - Lynx home range size varies by the animal's gender, abundance of prey, season and the density of lynx populations (Hatler 1988; Koehler 1990; Poole 1994; Slough and Mowat 1996; Aubry *et al.* 2000; Mowat *et al.* 2000). Documented home ranges vary from 8 to 800 square kilometers (3 to 300 square miles) (Saunders 1963; Brand *et al.* 1976; Mech 1980; Parker *et al.* 1983; Koehler and Aubry 1994; Apps 2000; Mowat *et al.* 2000; Squires and Laurion 2000). Preliminary research supports the hypothesis that lynx home ranges at the southern extent of the species' range are generally large compared to those in the core of the range in Canada (Koehler and Aubry 1994; Apps 2000; Squires and Laurion 2000).

Lynx are capable of dispersing extremely long distances (Mech 1977; Washington Department of Wildlife 1993); for example, a male was documented traveling 616 kilometers (370 miles) (Brainerd 1985). Lynx disperse primarily when snowshoe hare (*Lepus americanus*) populations decline (Ward and Krebs 1985; Koehler and Aubry 1994; O'Donoghue *et al.* 1997; Poole 1997). Subadult lynx disperse even when prey is abundant (Poole 1997), presumably as an innate response to establish home ranges.

During the early 1960s and 1970s, there were numerous occurrences of lynx documented in atypical habitat, such as in North Dakota. In those years, harvest returns indicated unprecedented cyclic lynx highs for the 20<sup>th</sup> century in Canada (Adams 1963; Harger 1965; Mech 1973; Gunderson 1978; Thiel 1987; McKelvey *et al.* 2000b). Many of these unusual observations were probably dispersing animals that either were lost from the population or later returned to suitable habitat.

**Diet** - Snowshoe hares (*Lepus americanus*) are the primary prey of lynx, comprising 35-97 percent of the diet throughout the range of the lynx (Koehler and Aubry 1994). Other prey species include red squirrel (*Tamiasciurus hudsonicus*), grouse (*Bonasa umbellus*, *Dendragapus* spp., *Lagopus* spp.), flying squirrel (*Glaucomys sabrinus*), ground squirrel (*Spermophilus parryii*, *S. richardsonii*), porcupine (*Erethizon dorsatum*), beaver (*Castor canadensis*), mice (*Peromyscus* spp.), voles (*Microtus* spp.), shrews (*Sorex* spp.), fish, and ungulates as carrion or occasionally as prey (Saunders 1963; Van Zyll de Jong 1966; Nellis *et al.* 1972; Brand *et al.* 1976; Brand and Keith 1979; Koehler 1990; Staples 1995; O'Donoghue *et al.* 1998).

During the cycle when hares become scarce, the proportion and importance of other prey species, especially red squirrel, increases in the diet (Brand *et al.* 1976; O'Donoghue *et al.* 1998; Apps 2000; Mowat *et al.* 2000). However, Koehler (1990) suggested that a diet of red squirrels alone might not be adequate to ensure lynx reproduction and survival of kittens.

Most research has focused on the winter diet. Summer diets are poorly understood throughout the range of lynx. Mowat *et al.* (2000) reported through their review of the literature that summer diets have less snowshoe hare and more alternate prey species, possibly because of a greater availability of other species.

There has been little research on lynx diet specific to the southern portion of its range except in Washington (Koehler *et al.* 1979; Koehler 1990). Southern populations of lynx may prey on a wider diversity of species than northern populations because of lower average hare densities and differences in small mammal communities. In areas characterized by patchy distribution of lynx habitat, lynx may prey opportunistically on other species that occur in adjacent habitats, potentially including white-tailed jackrabbit (*Lepus townsendii*), black-tailed jackrabbit (*Lepus californicus*), sage-grouse (*Centrocercus urophasianus*), and Columbian sharp-tailed grouse (*Tympanuchus phasianellus*) (Quinn and Parker 1987; Lewis and Wenger 1998).

In northern regions, when hare densities decline, the lower quality diet causes sudden decreases in the productivity of adult female lynx and decreased survival of kittens, which causes the numbers of breeding lynx to level off or decrease (Nellis *et al.* 1972; Brand *et al.* 1976; Brand and Keith 1979; Poole 1994; Slough and Mowat 1996; O'Donoghue *et al.* 1997). Relative densities of snowshoe hares at southern latitudes are generally lower than those in the north, and differing interpretations of the population dynamics of southern populations of snowshoe hare have been proposed (Hodges 2000b).

Snowshoe hares have evolved to survive in areas that receive deep snow (Bittner and Rongstad 1982). Primary forest types that support snowshoe hare are *Abies lasiocarpa* (subalpine fir), *Picea engelmannii* (Engelmann spruce), *Pseudotsuga menziesii* (Douglas-fir), and *Pinus contorta* (lodgepole pine) in the western United States, and spruce/fir, pine, and deciduous forests in the eastern United States (Hodges 2000b). Within these habitat types, snowshoe hares prefer stands of conifers with shrub understories that provide forage, cover to escape predators, and protection during extreme weather (Wolfe *et al.* 1982; Monthey 1986; Koehler and Aubrey 1994). Hares' use of habitat is correlated with understory cover (Hodges 2000a). Early successional forest stages generally have greater understory structure than do mature forests and therefore support higher hare densities (Hodges 2000a, b). However, mature forests can also provide snowshoe hare habitat as openings are created in the canopy when trees succumb to disease, fire, wind, ice, or insects, and the understory develops (Buskirk *et al.* 2000b).

Lynx seem to prefer to move through continuous forest, using the highest terrain available such as ridges and saddles (Koehler 1990; Staples 1995). Cover is important to lynx when searching for food (Brand *et al.* 1976) but lynx often hunt along edges (Mowat *et al.* 2000). Kesterson (1988) and Staples (1995) reported that lynx hunted along the edges of mature stands within a burned forest matrix and Major (1989) found that lynx hunted along the edge of dense riparian willow stands. Lynx have been observed (via snow tracking) to avoid large openings (Koehler 1990; Staples 1995) during daily movements within the home range.

**Den site selection** - Lynx use large woody debris, such as downed logs, root wads and windfalls, to provide denning sites with security and thermal cover for kittens (McCord and Cardoza 1982; Koehler 1990; Koehler and Brittell 1990; Mowat *et al.* 2000; Squires and Laurion 2000). During the first few months of life, kittens are left alone at these sites when the female lynx hunts. Downed logs and overhead cover provide protection of kittens from predators, such as owls, hawks and other carnivores during this period.

The age of the forest stand does not seem as important for denning habitat as the amount of downed, woody debris available (Mowat *et al.* 2000). Den sites may be located within older regenerating stands (>20 years since disturbance) or in mature conifer or mixed conifer-deciduous (typically spruce/fir or spruce/birch) forests. In Washington, lynx used lodgepole pine, *Picea* spp. (spruce), and *Abies lasiocarpa* (subalpine fir) forests older than 200 years with an abundance of downed woody debris for denning (Koehler 1990). A den site in Wyoming was located in a mature subalpine fir/lodgepole pine forest with abundant downed logs and a high amount of horizontal cover (Squires and Laurion 2000). A lynx den site found in Maine in 1999 was located in a forest stand in *Picea rubra* (red spruce) cover type that was logged in 1930 and again in the 1980s and is regenerating into hardwoods (Organ 1999). The site had a dense understory and an abundance of dead and downed wood.

Denning habitat must be in or near foraging habitat to be functional. The hunting range of females is restricted at the time of parturition, and their need to feed kittens requires an abundance of prey. Lynx, like other carnivores, frequently move their kittens until they are old enough to hunt with their mother. Multiple nursery sites are needed that provide kittens with overhead cover and protection from predators and the elements. Downed logs and overhead cover must also be available throughout the home range to provide security when lynx kittens are old enough to travel (Bailey 1974).

**Recruitment** - Breeding occurs through March and April in the north (Quinn and Parker 1987). Kittens are born in May to June in south-central Yukon (Slough and Mowat 1996). The male lynx does not help with rearing young (Eisenberg 1986). Slough and Mowat (1996) reported yearling females giving birth during periods when hares were abundant; male lynx may be incapable of breeding during their first year (McCord and Cardoza 1982).

In northern study areas during the low phase of the hare cycle, few, if any, live kittens are born and few yearling females conceive (Brand and Keith 1979; Poole 1994; Slough and Mowat 1996). However, Mowat *et al.* (2000) suggested that in the far north, some lynx recruitment occurs when hares are scarce and this may be important in lynx population maintenance during hare lows. During periods of hare abundance in the northern taiga, litter size of adult females averages 4-5 kittens (Mowat *et al.* 1996).

Koehler (1990) suggested that the low number of kittens produced in north-central Washington was comparable to northern populations during periods of low snowshoe hare abundance. In his study area, 2 radio-collared females had litters of 3 and 4 kittens in 1986 and 1 kitten in 1987 (the actual litter size of 1 of the females in 1987 was not determined) (Koehler 1990). Of the known-size litters in Washington, 1 kitten survived the first winter.

In Montana, Squires and Laurion (2000) reported that 1 marked female produced 2 kittens in 1998.

In 1999, 2 of 3 females produced litters of 2 kittens each. In Wyoming (Squires and Laurion 2000), 1 female produced 4 kittens in 1998, but snow tracking indicated that the kittens were not with the female in November and were presumed dead. The same female produced 2 kittens in 1999.

**Mortality** - Reported causes of lynx mortality vary between studies. The most commonly reported causes include starvation of kittens (Quinn and Parker 1987; Koehler 1990), and human-caused mortality, mostly fur trapping (Ward and Krebs 1985; Bailey *et al.* 1986).

Significant lynx mortality due to starvation has been demonstrated in cyclic populations of the northern taiga, during the first two years of hare scarcity (Poole 1994; Slough and Mowat 1996). Various studies have shown that, during periods of low snowshoe hare numbers, starvation can account for up to two-thirds of all natural lynx deaths. Trapping mortality may be additive rather than compensatory during the low period of the snowshoe hare cycle (Brand and Keith 1979). Hunger-related stress, which induces dispersal, may increase the exposure of lynx to other forms of mortality such as trapping and highway collisions (Brand and Keith 1979; Carbon and Patriquin 1983; Ward and Krebs 1985; Bailey *et al.* 1986).

Paved roads have been a mortality factor in lynx translocation efforts within historical lynx range. In New York, 18 translocated lynx were killed on highways (Brocke *et al.* 1990). It has been suggested by Brocke *et al.* (1990) that translocated animals may be more vulnerable to highway mortality than resident lynx. Six lynx were killed on 2- and 4-lane Colorado highways following their release as part of a reintroduction effort (CDOW 2003).

Other than translocated animals, there have been documented occurrences of highway mortality of lynx in Wisconsin (Theil 1987), Minnesota (DonCarlos 1994; J. Cochrane, USFWS, pers. comm. 2003), and Montana (G. Joslin, Montana Department of Fish, Wildlife and Parks, pers. comm. 2003).

Predation on lynx by mountain lion (*Felis concolor*), coyote (*Canis latrans*), wolverine (*Gulo gulo*), gray wolf (*Canis lupus*), fisher (*Martes pennanti*) and other lynx has been confirmed (Berrie 1974; Koehler *et al.* 1979; Poole 1994; Slough and Mowat 1996; O'Donoghue *et al.* 1997; Apps 2000; Vashon *et al.* 2003; Squires and Laurion 2000). Squires and Laurion (2000) reported 2 of 6 mortalities of radio-collared lynx in Montana were due to mountain lion predation. Observations of such events are rare, and the significance of predation on lynx populations is unknown.

**Interspecific relationships with other carnivores** - Buskirk *et al.* (2000a) described the two major competition impacts to lynx as exploitation (competition for food) and interference (avoidance). Of several predators examined (birds of prey, coyote, gray wolf, mountain lion, bobcat (*Lynx rufus*), and wolverine), coyotes were deemed to most likely pose local or regionally important exploitation impacts to lynx, and coyotes and bobcats were deemed to possibly impart important interference competition effects on lynx. Mountain lions were described as

interference competitors, possibly impacting lynx during summer and in areas lacking deep snow in winter, or when high elevation snow packs develop crust in the spring.

Exploitation competition may contribute to lynx starvation and reduced recruitment. During periods of low snowshoe hare numbers, starvation accounted for up to two-thirds of all natural lynx deaths in the Northwest Territories of Canada (Poole 1994). Major predators of snowshoe hare include lynx, northern goshawk (*Accipiter gentilis*), great horned owl (*Bubo virginianus*), bobcat, coyote, red fox (*Vulpes vulpes*), fisher, and mountain lion. In southern portions of snowshoe hare range, predators may limit hare populations to lower densities than in the taiga (Dolbeer and Clark 1975; Wolff 1980; Koehler and Aubry 1994).

Based on only anecdotal evidence, Parker *et al.* (1983) discussed competition between bobcats and lynx on Cape Breton Island. Lynx were found to be common over much of the island prior to bobcat colonization. Concurrent with the colonization of the island by bobcats, lynx densities declined and their presence on the island became restricted to the highlands, the one area where bobcats did not become established.

### **Population Dynamics**

In Canada and Alaska, lynx populations undergo extreme fluctuations in response to snowshoe hare population cycles, enlarging or dispersing from their home ranges and ceasing the recruitment of young into the population after hare populations decline (Mowat *et al.* 2000). In the southern portion of the range in the contiguous United States, lynx populations appear to be naturally limited by the availability of snowshoe hares, as suggested by large home range size, high kitten mortality due to starvation, and greater reliance on alternate prey. These characteristics appear to be similar to those exhibited by lynx populations in the taiga during the low phase of the population cycle (Quinn and Parker 1987, Koehler 1990, Aubry *et al.* 2000). This is likely due to the inherently patchy distribution of lynx and hare habitat in the contiguous United States and corresponding lower densities of hares.

A lack of accurate data limits our understanding of lynx population dynamics in the contiguous United States and precludes drawing definitive conclusions about lynx population trends. Formal surveys designed specifically to detect lynx have rarely been conducted. Many reports of lynx (e.g., visual observations, snow tracks) have been collected incidentally to other activities, but cannot be used to infer population trends. Long-term trapping data have been used to estimate population trends for various species. However, trapping returns are strongly influenced by trapper effort, which varies between years, and therefore may not accurately reflect population trends. Another important problem is that trapping records of many States did not differentiate between bobcats and lynx, referring to both as “lynxcats.” Overall, the available data are too incomplete to infer much beyond simple occurrence and distribution of lynx in the contiguous United States (McKelvey *et al.* 2000b)

Lynx populations in the contiguous United States occur at the southern periphery of a metapopulation whose core is located in the northern boreal forest of central Canada (McCord and Cardoza 1982; Quinn and Parker 1987; McKelvey *et al.* 2000a). Lynx population dynamics may emanate from the core to the periphery, as evidenced by a lagged correlation of lynx trap records and observations (McKelvey *et al.* 2000b; Mowat *et al.* 2000). In the Great Lakes Geographic Area, population dynamics in recent decades appear to be strongly driven by

immigration from Canada (McKelvey *et al.* 2000b). In other areas and time periods, however, it is not known to what extent the correlation is due to immigration from Canada, population responses to the same factors controlling northern populations, or a combination of the two.

We suspect that some areas in the contiguous United States naturally act as sources of lynx (recruitment is greater than mortality) that are able to disperse and potentially colonize other patches (McKelvey *et al.* 2000a). Other areas may function as sinks, where lynx mortality is greater than recruitment and lynx are lost from the overall population. Sink habitats are most likely those places on the periphery of the southern boreal forest where habitat becomes more fragmented and more distant from larger lynx populations. Fluctuations in prey populations may cause some habitat patches to change from being sinks to sources, and vice versa. The ability of naturally dynamic habitat to support lynx populations may change as the habitat undergoes natural succession following natural or manmade disturbances (i.e., fire, clearcutting).

### **Status and Distribution**

The lynx in the contiguous United States was listed as threatened effective April 23, 2000 (65 FR 16052, March 24, 2000). At least one of five listing factors must be met for listing under the ESA. These factors include: present or threatened destruction of habitat or range, over-utilization, disease or predation, inadequacy of existing regulatory mechanisms or other natural or human-made causes. The sole factor for listing the Canada lynx as threatened was inadequacy of existing regulatory mechanisms, specifically the lack of Forest Land and Resource Management Plans guidance to address the needs of lynx.

The following discussion of the status and distribution of lynx is largely excerpted from the Service's final rule (65 FR 16052, March 24, 2000). The historical and present range of the lynx north of the contiguous United States includes Alaska and that part of Canada that extends from the Yukon and Northwest Territories south across the United States border and east to New Brunswick and Nova Scotia. In the contiguous United States, lynx historically occurred in the Cascades Range of Washington and Oregon; the Rocky Mountain Range in Montana, Wyoming, Idaho, eastern Washington, eastern Oregon, northern Utah, and Colorado; the western Great Lakes Region; and the northeastern United States region from Maine southwest to New York (McCord and Cardoza 1982; Quinn and Parker 1987).

The distribution of lynx in North America is closely associated with the distribution of North American boreal forest (Agee 2000). In Canada and Alaska, lynx inhabit the classic boreal forest ecosystem known as the taiga (McCord and Cardoza 1982; Quinn and Parker 1987; Agee 2000; McKelvey *et al.* 2000b). The range of lynx extends south from the classic boreal forest zone into the subalpine forest of the western United States, and the boreal/hardwood forest ecotone in the eastern United States (Agee 2000; McKelvey *et al.* 2000b). Forests with boreal features (Agee 2000) extend south into the contiguous United States along the Cascade and Rocky Mountain Ranges in the west, the western Great Lakes Region, and along the Appalachian Mountain Range of the northeastern United States. Within these general forest types, lynx are most likely to persist in areas that receive deep snow, to which the lynx is highly adapted (Ruggiero *et al.* 2000). Lynx are rare or absent from the wet coastal forests of Alaska and Canada (Mowat *et al.* 2000).

At its southern margins in the contiguous United States, forests with boreal features, or southern boreal forests, become naturally fragmented as they transition into other vegetation types. Southern boreal forest habitat patches are small relative to the extensive northern boreal forest of Canada and Alaska, which constitutes the majority of lynx range. Many southern boreal forest habitat patches within the contiguous United States cannot support resident populations of lynx and their primary prey species.

The complexities of lynx life-history and population dynamics, combined with a general lack of reliable population data for the contiguous United States, make it difficult to ascertain the past or present population status of lynx in the contiguous United States. It is impossible to determine with certainty whether reports of lynx in many States were: 1) animals dispersing from northern populations that were effectively lost because they did not join or establish resident populations, 2) animals that were a part of a resident population that persisted for many generations, or 3) a mixture of both resident and dispersing animals.

The final rule (65 FR 16052, March 24, 2000) determining threatened status for the lynx in the contiguous United States summarized lynx status and distribution across four regions that are separated from each other by ecological barriers consisting of unsuitable lynx habitat. These distinct regions are the Northeast, the Great Lakes, the Northern Rocky Mountains/Cascades, and the Southern Rocky Mountains. While these regions are ecologically unique and discrete, the lynx is associated with southern boreal forest in each and, with the exception of the Southern Rocky Mountain Region; each area is geographically connected to the much larger population of lynx in Canada.

***Northeast Region (Maine, New Hampshire, Vermont, New York)*** - Based on an analysis of cover types and elevation zones containing most of the lynx occurrences, McKelvey *et al.* (2000b) determined that, at the broad scale, most lynx occurrence records in the Northeast were found within the “Mixed Forest-Coniferous Forest-Tundra” cover type at elevations ranging from 250-750 meters (820-2,460 feet). This habitat type in the northeast United States occurs along the northern Appalachian Mountain range from southeastern Quebec, western New Brunswick, and western Maine, south through northern New Hampshire. This habitat type becomes naturally more fragmented and begins to diminish to the south and west, with a disjunct segment running north-south through Vermont, a patch of habitat in the Adirondacks of northern New York, and with a few more distant and isolated patches in Pennsylvania (McKelvey *et al.* 2000b).

As it did historically, the boreal forest of the Northeast continues to exist primarily in Maine where habitat is currently optimal and a resident, breeding population of lynx continues to exist. Maine’s lynx population is currently much larger than we knew at the time of the final listing rule in 2000 and habitat is directly connected to substantive lynx populations and habitat in southeastern Quebec and New Brunswick. The potential exists for lynx to occur in New Hampshire because of its direct connectivity with Maine. Lynx in Vermont have always existed solely as dispersers. Lynx occurring in New York since 1900 have been dispersers. Detailed information on the status and distribution of lynx in this region is found in the Final Rule (65 FR 16052; March 24, 2000) and the Clarification of the Final Rule (68 FR 40076; July 3, 2003).



**Great Lakes Region (Minnesota, Wisconsin, Michigan)** - The majority of lynx occurrence records in the Great Lakes Region are associated with the “mixed deciduous-coniferous forest” type (McKelvey *et al.* 2000b). Within this general forest type, the highest frequency of lynx occurrences were in the *Acer saccharum* (sugar maple), *Tilia* spp. (basswood), *Pinus banksiana* (jack pine), *P. strobus* (white pine), and *P. resinosa* (red pine) forest types (McKelvey *et al.* 2000b). These types are found primarily in northeastern Minnesota, northern Wisconsin, and the western portion of Michigan’s upper peninsula.

We conclude that northeastern Minnesota has historically supported and currently supports a resident lynx population, based on the number of lynx records, evidence of reproduction, and the presence of boreal forest contiguous with occupied habitat in Ontario. We conclude records of lynx in Wisconsin and Michigan constitute dispersing animals, rather than individuals from resident populations, based on the lack of evidence of reproduction, lack of connectivity with suitable habitat, and limited amount of habitat. Detailed information on the status and distribution of lynx in this region is found in the Final Rule (65 FR 16052; March 24, 2000) and the Clarification of the Final Rule (68 FR 40076; July 3, 2003).

**Northern Rocky Mountains/Cascades Region (Washington, Oregon, Idaho, Wyoming, Utah, Montana)** - In this region, the majority of lynx occurrences are associated at a broad scale with the “Rocky Mountain Conifer Forest”; within this type, most of the occurrences are in moist Douglas-fir and western spruce/fir forests (McKelvey *et al.* 2000b). Most of the lynx occurrences are in the 1,500-2,000 meters (4,920-6,560 feet) elevation class (McKelvey *et al.* 2000b). These habitats are found in the Rocky Mountains of Montana, Idaho, eastern Washington, and Utah, the Wallowa Mountains and Blue Mountains of southeast Washington and northeastern Oregon, and the Cascade Mountains in Washington and Oregon. The majority of verified lynx occurrences in the United States and the confirmed presence of resident populations are from this region. The boreal forest of Washington, Montana, and Idaho is contiguous with that in adjacent British Columbia and Alberta, Canada.

We conclude that the Northern Rocky Mountains/Cascades Region continues to support resident lynx populations in north central, and northeastern Washington, western Montana and likely northern Idaho based on current evidence of reproduction in Washington and Montana and the presence of habitat able to support resident populations. We conclude that lynx have always occurred as dispersers in Oregon and Utah because habitat capable of supporting lynx is limited and there are relatively few historic records of lynx in these states. In northern Wyoming it appears habitat is less suitable to support resident populations and, therefore, we conclude animals in this area are most likely dispersers. Detailed information on the status and distribution of lynx in this region is found in the Final Rule (65 FR 16052; March 24, 2000) and the Clarification of the Final Rule (68 FR 40076; July 3, 2003).

**Southern Rocky Mountains Region (Colorado, SE Wyoming)** - Colorado represents the extreme southern edge of the range of the lynx. The southern boreal forest of Colorado and southeastern Wyoming is isolated from boreal forest in Utah and northwestern Wyoming by the Green River Valley and the Wyoming basin (Findley and Anderson 1956). These areas likely reduce opportunities for immigration from the Northern Rocky Mountains/Cascades Region and Canada (Halfpenny *et al.* 1982; Koehler and Aubry 1994).

A majority of the lynx occurrence records in Colorado and southeastern Wyoming are associated with the “Rocky Mountain Conifer Forest” type. The occurrences in the Southern Rockies were generally at higher elevations (1,250 to over 3,750 meters (4,100-12,300 feet)) than were all other occurrences in the West (McKelvey *et al.* 2000b).

There are relatively few historic lynx records from this region (McKelvey *et al.* 2000b). We are uncertain whether the Southern Rockies supported a small resident population historically or whether such records were of dispersers that arrived during extremely high population cycles. If these historic records represent resident populations rather than dispersing animals that emigrated from the Northern Rocky Mountains, Cascades or Canada, then we believe a viable native resident lynx population no longer exists in the Southern Rocky Mountains. Although habitats in the Southern Rockies are far from source populations and more isolated, it is still possible that dispersers could arrive in the Southern Rocky Mountains during extreme highs in the population cycle. Detailed information on the status and distribution of lynx in this region is found in the Final Rule (65 FR 16052; March 24, 2000) and the Clarification of the Final Rule (68 FR 40076; July 3, 2003).

***Reports from other locations*** - Lynx have been documented in habitats that are unable to support them long-term. Such occurrences are associated with cyclic population highs when lynx tend to disperse long distances. These unpredictable and temporary occurrences are not included within either the historic or current range of lynx because they are well outside of lynx habitat (65 FR 16052, March 24, 2000; 68 FR 40076, July 3, 2003). This includes records from Nevada, North Dakota, South Dakota, Iowa, Nebraska, Indiana, Ohio, and Virginia (Hall and Kelson 1959; Burt 1954; Gunderson 1978; Mech 1980; McKelvey *et al.* 2000b; Johnson 1994; Jones 1994; South Dakota Natural Heritage Program 1994; Jobman 1997; Smithsonian Institute 1998).

***Status In the Southern Rockies*** - Canada lynx occur primarily in spruce-fir and lodgepole pine forests, at elevations between 8,000 and 12,000 feet (Ruggiero *et al.* 1999). *Populus tremuloides* (Quaking aspen) stands and forest edges, as well as open grass meadows and forest ecotones, may also support high numbers of hares and Canada lynx. On a landscape scale, Canada lynx habitat includes a mosaic of early seral stages that support snowshoe hare populations and late seral stages of dense old growth forest that provide ideal denning and security habitat. Connectivity between Canada lynx populations is critical: Dispersal corridors should be several miles wide with only narrow gaps. Large tracts of continuous coniferous forest are the most desirable for Canada lynx travel and dispersal (Tanimoto 1998).

Records of lynx occurrence are available from throughout most of the Southern Rocky Mountains. The last specimens of lynx taken in the Southern Rockies were from the late 1960s and early 1970s. In 1969, three lynx specimens were taken in adjacent counties in the central core of the Southern Rockies. One was shot along the Fryingpan River in Pitkin County, another on Vail Mountain (Eagle County), and a third was trapped south of Leadville in Lake County (G. Byrne, pers. comm. 1999). In 1971, the State of Colorado closed the season on lynx, making it illegal to take this species. Since then, only a few specimens have been obtained. In 1972, a lynx was trapped on Guanella Pass and another caught in a snow slide east of Bakerville, Colorado, both in Clear Creek County. During the 1973-74 winter, a pair of lynx was illegally trapped within Vail Ski Area boundaries (Thompson and Halfpenny 1989). No lynx specimens are available since those last illegal takes.

Despite the resulting lack of recent specimens, strong evidence of lynx persistence continued to surface. A Statewide lynx verification program conducted from 1978-80 by the Colorado Division of Wildlife (CDOW) concluded that viable, low-density lynx populations persisted in Eagle, Pitkin, Lake, and Clear Creek counties. Because Summit County is sandwiched between three of those counties, it is likely that lynx existed there as well. In addition, the program provided evidence of lynx occurrence in Grand and Park counties. Lack of evidence from other portions of the State was as likely a consequence of survey effort as lack of lynx.

Thompson and Halfpenny (1989) confirmed lynx in the vicinity of Vail Ski Area during the winter of 1988-89 as part of studies conducted by Vail Associates for the Category III expansion. They state in their report, "there is no question that lynx exist at Vail Ski Area and in the surrounding mountains." Follow-up work by the CDOW in 1990 and 1991 led to the discovery of additional lynx tracks in the area. In 1991, Thompson and Halfpenny also confirmed two sets of lynx tracks at a proposed ski area site south of Wolf Creek Pass in the eastern San Juan Mountains (Andrews 1992; Thompson, pers. comm.). They believed the pair was probably a female and its kitten.

Occasional credible sighting reports and track evidence continue to be received from various parts of the State, providing additional evidence that native lynx likely still persist in low numbers in the Southern Rockies. Since the 1991 track discoveries near Vail and in the San Juans, the CDOW has recorded seven lynx sightings or track locations between 1992 and 1998 that they rate as probable lynx. Three of those were by CDOW biologists. Carney (1993) reported lynx tracks from the east side of the Gore Range in Summit County. Tom Beck, a carnivore researcher with CDOW, found a set of lynx tracks in the Dolores River drainage in the west San Juans, Montezuma County in 1993. A CDOW Area Wildlife Manager observed a lynx in the southern Sangre de Cristos of Costilla County, also in 1993. Two sightings and one set of tracks were reported from Eagle County and another set of tracks was located in Larimer County north of Rocky Mountain National Park.

In 1997, photographs were taken of tracks believed to be those of lynx in the Tennessee Creek drainage on the border of Lake and Eagle counties. This is an area where possible lynx tracks were located just a few years earlier. Among the most recent credible sighting reports include one from Boreas Pass on the border of Summit and Park Counties in 1995, another from the Vail vicinity in January 1998, one from a Forest Service biologist in July 1998 on the Flattops in northwestern Colorado, and from a Park Ranger in Rocky Mountain National Park (Larimer County) in December 1998. During the 1998-99 winter, CDOW trackers following radio-collared lynx just transplanted into the San Juan Mountains, located a several-day-old lynx trail they believed may be that of a native lynx (Byrne and Shenk, pers. comm.). This location was in the same general area where Thompson and Halfpenny located lynx tracks in 1991.

Lynx were confirmed in Eagle County as late as 1991, and in Summit County (Gore Range) as late as 1993. Evidence has continued to indicate lynx occupancy of the central and, possibly, northern mountains through the 1990s. This evidence includes a sighting by a Forest Service biologist in July 1998 in the Flattops in northwestern Colorado, and tracks in Larimer County north of Rocky Mountain National Park. The CDOW found evidence of lynx in Eagle County and in Grand County. Radio tracking in 2000 of lynx trans-located to Colorado indicated that a few individuals spent time in the Gore Range. In July 2001, CDOW reported a collared lynx in

the Flattops Wilderness Area (Shenk, pers. comm. 2002). It is conceivable that native lynx may yet occupy the high mountain landscapes in Colorado.

The Canada lynx has been classified by the State of Colorado as a State endangered species since 1976. In 2000, the Service classified the lynx as a federally threatened species. Since 1978, there have been 14 investigations into naturally occurring lynx presence in Colorado conducted by the CDOW and other private and public conservation groups. Definitive evidence has not been found to document the presence of lynx from these studies though tracks attributed to lynx were found on a number of occasions.

The CDOW initiated a Canada lynx recovery program in February 1999. The program augmented any existing population with transplants from Canada and Alaska, with the intent of reestablishing viable, self-sustaining populations in primary blocks of suitable habitat throughout the Southern Rocky Mountains. Ninety-six lynx were released into the San Juan Mountains during the winter/spring periods of 1999 and 2000 by the CDOW. In 2003, 33 additional lynx were released into south-central Colorado as part of the State's recovery program. Additional lynx are to be released to further the goal of establishing a viable lynx population in Colorado. In May and June of 2003, the State of Colorado confirmed the birth of 16 lynx kittens. Evidence of reproduction, and multiple individuals within each litter suggests that there is an adequate local supply of prey. Some of the lynx initially released by the CDOW appear to have established home ranges, as demonstrated by radio telemetry (Tanya Shenk, CDOW, 2003, pers comm.). Many of the released lynx have displayed fidelity to areas away from the release areas suggesting that they have sought these areas out, and sufficient prey exists to support them. After the first year of the program, there was evidence suggesting that there was insufficient prey availability in the Southern Rockies. Diet analysis conducted by the CDOW showed that only 67 percent of the diet consisted on snowshoe hare. At this time however, 89 percent of the diet of the released lynx population consists of snowshoe hare (Shenk, CDOW, 2003, pers comm.). This suggests that after release, lynx were seeking out areas within the ecosystem that supported high numbers of prey, and, in the mean time relied on other prey to sustain them. Most of these lynx are currently known to occupy the San Juan Mountains. A number of lynx have made and continue to make exploratory movements throughout the Southern Rockies. Several animals have taken up residence for extended periods in the central and northern mountains. Currently, lynx may exist in most major portions of the Southern Rockies Ecosystem.

Most lynx that are currently being monitored continue to use terrain within the core research area: New Mexico north to Gunnison, west as far as Taylor Mesa and east to Monarch Pass. There are some lynx north of Gunnison up to the I-70 corridor and in the Taylor Park area.

The State is currently tracking 62 of the 84 lynx still possibly alive. No signals have been detected for 20 of the lynx since at least May 24, 2002. One of these missing lynx is the lynx hit by a truck in New Mexico, thus only 19 are truly missing. A number of these lynx are now missing because their collar batteries have died and we can no longer pickup radio signals. Some of the missing lynx may still have functioning collars but are outside the research area. Expanded flights outside the research area during the summer and fall months may yield locating these missing lynx. Two of the lynx released in 2000 have probably slipped their collars. One of the male lynx released in 2003 has died from unknown circumstances.

## ENVIRONMENTAL BASELINE

The environmental baseline is defined as the past and present impacts on the Canada lynx of all Federal, state or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impacts of State or private actions that are contemporaneous with the consultation in process.

The action area considered in this opinion includes the Rio Grande National Forest and the LAU's within that geographic boundary, adjacent Federal lands where lynx habitat occurs contiguous with the Rio Grande National Forest (LAUs from adjacent Forest Service and Bureau of Land Management units), as well as four landscape linkages: Poncha Pass, Cochetopa Hills/North Pass, Slumgullion Pass, and Wolf Creek Pass.

The inclusion of these areas within the action area is due to: mapped habitat areas on the Rio Grande National Forest, and recommended conservation measures in the LCAS, including but not limited to, maintenance of movement corridors within and between LAU's, and the maintenance of landscape linkages that facilitate movement across areas of non-habitat that link large blocks of contiguous habitat.

The BA described LTAs as broad ecological units expressed as similar forest plant communities and ecological potential. LTAs have a spatial resolution of hundreds to thousands of acres in size, making them generally useful and appropriate for Forest Plan scale analysis. However, except for the Canada lynx, species addressed in this biological assessment have such specialized habitat needs, that their habitats are limited in extent on the Forest and do not lend themselves to that scale of analysis. Still, use of the LTAs may provide a context for the amount of available habitat and the relative amount of risk associated with management activities on the Rio Grande National Forest. Table 2 in the BA documents the LTAs for lynx as spruce/fir, willow sedge mixed conifer, and aspen. These LTAs comprise 1,083,953 acres of suitable habitat for lynx, out of a total of 1,852,000 acres on the Rio Grande National Forest.

Table 3 in the BA provides a summary of the LAUs, types and acres of lynx habitat on the Forest. There are an estimated 1,083,953 acres of lynx habitat, based on habitat criteria provided by the LCAS. Lynx habitat is found throughout the Forest in almost all of the LTAs, but is primarily concentrated within subalpine, forested, and riparian LTAs.

Various threats were identified by the Service in the final rule (2000) to list Canada lynx as potentially affecting lynx populations, including competition, habitat loss and fragmentation, and the inadequacy of existing regulatory mechanisms to protect the species, specifically the lack of guidance for the conservation of lynx in Forest Plans and BLM Land Use Plans. A cooperative team from the Forest Service and BLM prepared a national programmatic BA of the potential effects resulting from these Plans within the 16 states where lynx were listed. The national programmatic BA made a determination that the Plans "may affect and are likely to adversely affect the lynx."

Within the Southern Rocky Mountain Geographic Area, which includes the Rio Grande National Forest, the national programmatic BA found adverse effects based on 11 of the 15 evaluation

criteria used to analyze the programmatic effects of plans on the lynx. The finding of adverse effect was primarily based on plans providing weak direction regarding the evaluation criteria. Findings specific to the Rio Grande National Forest Forest Plan are similar in that regard and are shown in Table 1.

**Table 1. Summary of how Rio Grande National Forest Forest Plan direction meets evaluation criteria.**

<b>EVALUATION CRITERIA</b>	<b>HOW RIO GRANDE NATIONAL FOREST MEETS CRITERIA</b>
Denning Habitat (Forest Plan contains either specific or incidental direction that results in providing denning habitat)	Marginally
Foraging Habitat (Forest Plan contains either specific or incidental direction that results in providing foraging habitat)	Marginally
Habitat Conversions (Forest Plan prohibits habitat conversions that would reduce habitat suitability for lynx)	Does not meet
Thinning (Forest Plan provides direction for integrating lynx habitat needs in stand thinning projects)	Marginally
Fire Management (Forest Plan incorporates fire management direction that helps maintain or improve lynx habitat).	Fully
Landscape Patterns (Forest Plan direction either directly or indirectly results in landscape vegetation patterns that maintain or improve lynx habitat suitability)	Marginally
Forest Roads (Forest Plan contains direction pertaining to roads that helps promote lynx conservation)	Marginally
Developed Recreation (Forest Plan contains direction that mitigates the effects of developed recreation on lynx and lynx habitat)	Does not meet
Non-winter Dispersed Recreation (Forest Plan contains direction that mitigates the effects of non-winter dispersed recreation on lynx and lynx habitat)	Substantially
Winter Dispersed Recreation (Forest Plan contains direction that mitigates the effects of winter dispersed recreation on lynx and lynx habitat)	Substantially
Minerals (Forest Plan contains direction that mitigates the effects of minerals and energy development on lynx and lynx habitat)	Does not meet
Connectivity (Forest Plan contains direction that mitigates potential barriers to lynx movement and maintains habitat connectivity. Riparian management and other connectivity issues are considered)	Marginally
Land Adjustments (Forest Plan contains direction that maintains or improves lynx habitat during land tenure adjustments)	Marginally
Coordination (Forest Plan contains specific direction for coordinating issues that may affect lynx with nearby units and other agencies)	Marginally
Monitoring (Forest Plan contains direction for monitoring lynx and snowshoe hare or their habitats)	Does not meet

After completion of the national programmatic BA, the lynx was listed and in 2000, the Service issued a BO based on the BA, the then draft Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000). During the consultation, the Service evaluated the effects of the plans in consideration of the LCAS, the Canada Lynx Conservation Agreements (U.S. Forest Service and U.S. Fish and Wildlife Service 2000) and the Lynx Science Report, "Ecology and Conservation of the Lynx in the United States (Ruggiero et al. 2000). The BO found a no jeopardy conclusion based upon implementation of the Conservation Agreements until such time as the plans were amended or revised to consider the needs of lynx. The Service further concluded that continued

implementation of the plans, in conjunction with the CAs, might result in some level of adverse effects to lynx, as plans are permissive in that they allow, but do not authorize, actions to occur that may adversely affect lynx. However, the BO included an assessment of effects if the plans were amended or revised with the conservation measures in the LCAS and determined that such amendments or revisions would likely sufficiently minimize the potential for adverse effects and the effects of any take that might occur at the programmatic scale.

The LCAS developed conservation measures designed to minimize potential risk factors that may influence lynx or lynx habitat. Identified risk factors include:

Factors affecting lynx productivity- (timber management, wildland fire management, recreation, forest/backcountry roads and trails, livestock grazing, and other human developments).

Factors affecting lynx mortality- (trapping, predator control, incidental or illegal shooting, and competition and predation as influenced by human activities).

Factors affecting lynx movement- (highways, railroads and utility corridors, land ownership patterns, and ski areas and large resorts).

Other large-scale risk factors- (fragmentation and degradation of lynx refugia, lynx movement and dispersal across shrub-steppe habitats, and habitat degradation by non-native invasive plant species).

The national programmatic BA evaluated what plans permit or prohibit, assessing the language or direction of the plans rather than the realized effects of their implementation. The BA in general, found there was a lack of protective direction to address all 15 evaluation criteria and specifically that the Rio Grande National Forest did not meet 4 of the criteria, marginally met 8, substantially met 2, and fully met 1 (Table 1).

The CA commits the Forest Service to actions that will be taken to reduce or eliminate adverse effects or risks to the lynx and its habitat. Specifically, the Forest Service agrees that Forest Plans should include measures necessary to conserve lynx and that these measures will consider the Science Report, the LCAS and the Service's final listing decision (65 FR 16052). These conservation measures are to be incorporated during Forest Plan revision or amendment. In conformance with the CAs, Forests have identified and mapped lynx habitat, lynx analysis units and lynx linkage areas.

In the Southern Rocky Mountain Geographic Area, the Forest Service has a process underway to amend the affected Forest Plans. However, this regional amendment process has not yet been completed. Absent programmatic forest planning to conserve lynx, assessment of land management effects to lynx and development of appropriate conservation strategies are left to project-specific analyses without consideration for larger landscape patterns. Overall, Rio Grande National Forest Forest Plan direction marginally provides for lynx and lynx habitat and will require the regional amendment to fully meet the LCAS, as clarified by the Lynx Steering Committee (USDA 2002). Table 2 provides a specific comparison of Rio Grande National Forest Forest Plan direction to conservation measures identified in the LCAS.

Table 2. Crosswalk between the LCAS and Rio Grande National Forest Forest Plan direction.

<b>LCAS Conservation Measures (abbreviated)</b>	<b>Rio Grande National Forest Forest Plan Direction</b>
RE: All Programs	
<b>Programmatic Planning Objectives</b>	
1. Design vegetation management strategies that are consistent with historical succession and disturbance regimes.	Forestwide Desired Conditions for Biological Diversity
<b>Programmatic Planning Standards</b>	
1. Conservation measures will generally apply only to the lynx habitat on federal lands within LAUs.	Forest Plan direction applies to all Forest Service lands.
2. Lynx habitat will be mapped.	Mapping completed.
3. To facilitate project Forest Planning, delineate LAUs.	Completed as part of mapping.
4. To be effective for the intended purposes of planning and monitoring, LAU boundaries will not be adjusted.	LAU boundaries are fixed.
5. Limit disturbance within each LAU as follows: if no more than 30 percent of lynx habitat within a LAU is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management activities by federal agencies.	Per the CAs, proposed Forest actions are cumulatively analyzed by LAU to meet this conservation measure.
<b>Programmatic Planning Guidelines</b>	
1. The size of LAUs should generally be 6,500-10,000ha (16,000-25,000 acres or 25-50 square miles) in contiguous habitat.	Completed as part of mapping.
2. LAUs with only insignificant amounts of lynx habitat may be discarded.	Completed as part of mapping.
3. After LAUs are identified, their spatial arrangement should be evaluated.	Completed as part of mapping.
<b>Project Planning – Standards</b>	
1. Within each LAU, map lynx habitat.	Completed as part of mapping.
2. Within a LAU, maintain denning habitat in patches generally larger than 5 acres, comprising at least 10 percent of lynx habitat.	Per the CAs, proposed Forest actions are analyzed by LAU to meet this conservation measure.
3. Maintain habitat connectivity within and between LAUs.	Forestwide Desired Conditions for Biological Diversity; Forestwide Objective 2.4
RE: LYNX PRODUCTIVITY	
<i>Timber Management</i>	
<b>Programmatic Planning - Objectives</b>	
1. Evaluate historical conditions and landscape patterns to determine historical vegetation mosaics across landscapes through time.	To be completed by regional historic range of variability analyses.
2. Maintain suitable acres and juxtaposition of lynx habitat through time.	Forestwide Desired Conditions for Biological Diversity; Forestwide Objectives 2.3, 2.7 and 2.8
3. If the landscape has been fragmented by past management activities that reduced the quality of lynx habitat, adjust management practices to produce forest composition, structure and patterns more similar to those that would have occurred under historical disturbance regimes.	Biodiversity Standard 3; Guidelines 1 and 2 Silviculture Standard 3; Guidelines 6 and 11
<b>Project Planning - Objectives</b>	
1. Design regeneration harvest, planting, and thinning to develop characteristics suitable for lynx and snowshoe hare habitat.	Silviculture Guideline 11 Wildlife Standard 16
2. Design projects to retain/enhance existing habitat	Biodiversity Standard 1 and 3; Guidelines 1 and 2



<b>LCAS Conservation Measures (abbreviated)</b>	<b>Rio Grande National Forest Forest Plan Direction</b>
condition for important alternative prey.	Wildlife Standard 16
<b>PROJECT PLANNING - STANDARDS</b>	
1. Management actions (e.g., timber sales, salvage sales) shall not change more than 15 percent of lynx habitat within a LAU to unsuitable condition within a 10-year period.	Per the CAs, proposed Forest actions are cumulatively analyzed by LAU to meet this conservation measure.
2. Following a disturbance such as blowdown, fires, insects/pathogens mortality that could contribute to lynx denning habitat, do not salvage harvest when the affected area is smaller than 5 acres. Exceptions to this include: 1) areas such as developed campgrounds; 2) LAUs where denning habitat has been mapped and field validated (not simply modeled or estimated), and denning habitat comprises more than 10% of lynx habitat within a LAU; in these cases, salvage harvest may occur, provided that at least the minimum amount is maintained in a well-distributed pattern.	Per the CAs, proposed Forest actions are analyzed by LAU to meet this conservation measure.
3. In lynx habitat, pre-commercial thinning will be allowed only when stands no longer provide snowshoe hare habitat	No Forest Plan Guidance
4. In aspen stands within lynx habitat, apply harvest prescriptions that favor regeneration of aspen.	Forestwide Objective 2.8 Biodiversity Guidelines 2 and 3
<b>Project Planning - Guidelines</b>	
1. Plan regeneration harvest in lynx habitat where little or no habitat for snowshoe hares is currently available, to recruit a high density of conifers, hardwoods, and shrubs preferred by hares.	Forestwide Objective 3.3
2. In areas where recruitment of additional denning habitat is desired, or to extend the production of snowshoe hare foraging habitat where forage quality and quantity is declining due to plant succession, consider improvement harvests (commercial thinning, selection, etc).	Silviculture Standard 2; Guideline 11
<b>Wildland Fire Management</b>	
<b>Programmatic Planning Objectives</b>	
1. Restore fire as an ecological process.	Forestwide Desired Conditions for Fire Forestwide Objectives 2.9 and 2.10
2. Revise or develop fire management plans to integrate lynx habitat management objectives.	No Forest Plan Guidance
3. Consider use of mechanical pre-treatment and management ignitions if needed to restore fire as an ecological process.	Forestwide Objective 2.10
4. Adjust management practices where needed to produce forest composition, structure, and patterns more similar to those that would have occurred under historical succession and disturbance regimes.	Forestwide Objective 2.2
5. Design vegetation and fire management activities to retain or restore denning habitat on landscapes with the highest probability of escaping stand-replacing fire events.	No Forest Plan Guidance
<b>Project Planning - Objectives</b>	
1. Use fire as a tool to maintain or restore lynx habitat.	Forestwide Objective 2.9

<b>LCAS Conservation Measures (abbreviated)</b>	<b>Rio Grande National Forest Forest Plan Direction</b>
	Fire Guideline 2
2. When managing wildland fire, minimize creation of permanent travel ways that could facilitate increased access by competitors.	Sediment Control Standard 1 – Guideline 6 Sediment Control Standard 3 – Guideline 8 Sediment Control Standard 4 – Guideline 1
<b><u>Project Planning Standards</u></b>	
1. In the event of a large wildfire, conduct a post-disturbance assessment prior to salvage harvest, particularly in stands that were formerly in late successional stages, to evaluate potential for lynx denning and foraging habitat.	Forest Service Handbook, Rocky Mountain Region – Forest Planning procedures.
2. Design burn prescriptions to regenerate or create snowshoe hare habitat.	No Forest Plan Guidance
<b><u>Project Planning - Guidelines</u></b>	
1. Design burn prescriptions to promote response by shrub and tree species that are favored by snowshoe hare.	No Forest Plan Guidance
2. Design burn prescriptions to retain or encourage tree species composition and structure that will provide habitat for red squirrels or other alternate prey species.	No Forest Plan Guidance
3. Consider the need for pre-treatment of fuels before conducting management ignitions.	Forestwide Objective 2.10
4. Avoid construction of permanent firebreaks on ridges or saddles in lynx habitat.	CONFLICTS Sediment Control Standard 1 – Guideline 1
5. Minimize construction of temporary roads and machine fire lines to the extent possible during fire suppression activities.	Sediment Control Standard 1 – Guideline 6 Sediment Control Standard 3 – Guideline 8 Sediment Control Standard 4 – Guideline 1
6. Design burn prescriptions and, where feasible, conduct fire suppression action in a manner that maintains adequate lynx denning habitat (10% of lynx habitat per LAU).	Per the CAs, proposed Forest actions are cumulatively analyzed by LAU to meet this conservation measure.
<b><u>Recreation Management</u></b>	
<b><u>Programmatic Planning - Objectives</u></b>	
1. Plan for and manage recreational activities to protect the integrity of lynx habitat, considering as a minimum the following: a) Minimize snow compaction in lynx habitat. b) Concentrate recreational activities within existing developed areas, rather than developing new recreational areas in lynx habitat c) On Federal lands, ensure that development or expansion of developed recreation sites or ski areas and adjacent lands address landscape connectivity and lynx habitat needs.	No Forest Plan Guidance
<b><u>Programmatic Planning - Standards</u></b>	
1. On federal lands in lynx habitat, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU. This is intended to apply to dispersed recreation, rather than existing ski areas.	Per the CAs, proposed Forest actions are cumulatively analyzed by LAU to meet this conservation measure.
2. Map and monitor the location and intensity of snow compacting activities.	Concentrated winter use areas are mapped.
<b><u>Programmatic Planning – Guidelines</u></b>	
1. Provide a landscape with interconnected blocks of foraging habitat where snowmobile, cross-country skiing, snowshoeing, or other snow compacting activities are	No Forest Plan Guidance

<b>LCAS Conservation Measures (abbreviated)</b>	<b>Rio Grande National Forest Forest Plan Direction</b>
minimized or discouraged	
2. Limit or discourage activities that result in snow compaction in areas where it is shown to compromise lynx habitat.	Dispersed Recreation Standards 3 and 4
<b>Project Planning – Standards</b>	
<b>Developed Recreation</b>	
1. In lynx habitat, ensure that federal actions do not degrade or compromise landscape connectivity when planning and operating new or expanded recreation developments.	Per the CAs, proposed Forest actions are analyzed by LAU to meet this conservation measure.
2. Design trails, roads, and lift termini to direct winter use away from diurnal security habitat.	No Forest Plan Guidance
<b>Dispersed Recreation</b>	
1. To protect the integrity of lynx habitat, evaluate (as new information becomes available) and amend as needed, winter recreational special use permits (outside of permitted ski areas) that promote snow compacting activities in lynx habitat.	Special use permit authorizations have been consulted with the Service (September 2002).
<b>Project Planning – Guidelines</b>	
<b>Developed Recreation</b>	
1. Identify and protect potential security habitats in around proposed developments or expansions.	No Forest Plan Guidance
2. When designing ski area expansions, provide adequately sized coniferous inter-trail islands, including the retention of coarse woody material, to maintain snowshoe hare habitat.	Per the CAs, proposed Forest actions are analyzed by LAU to meet this conservation measure.
3. Evaluate, and adjust as necessary, ski operations in expanded or newly developed areas to provide nocturnal foraging opportunities for lynx in a manner consistent with operational needs.	Per the CAs, proposed Forest actions are analyzed by LAU to meet this conservation measure.
<b>Forest Backcountry Roads and Trails</b>	
<b>Programmatic Planning - Objectives</b>	
1. Maintain the natural competitive advantage of lynx in deep snow conditions	No Forest Plan Guidance
<b>Programmatic Planning- Standards</b>	
1. On Federal lands in lynx habitat, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU. Winter logging activity is not subject to this restriction.	Per the CAs, proposed Forest actions are cumulatively analyzed by LAU to meet this conservation measure.
<b>Programmatic Planning - Guidelines</b>	
1. Determine where high total road densities (greater than 2 miles per square mile) coincide with lynx habitat, and prioritize roads for seasonal restrictions or reclamation in those areas.	A road analysis plan will be completed in FY04 to inform road management decisions.
2. Minimize roadside brushing in order to provide snowshoe hare habitat.	No Forest Plan Guidance
3. Locate trails and roads away from forested stringers.	No Forest Plan Guidance
4. Limit public use on temporary roads constructed for timber sales. Design new roads, especially the entrance, for effective closure upon completion of sale activities.	No Forest Plan Guidance
5. Minimize building of roads directly on ridge tops or areas identified as important for lynx habitat	<b>CONFLICTS</b> with Sediment Control Standard 1 - Guideline 1

<b>LCAS Conservation Measures (abbreviated)</b>	<b>Rio Grande National Forest Forest Plan Direction</b>
connectivity.	
<b><i>Livestock Grazing</i></b>	
<b><u>Programmatic Planning - Objectives</u></b>	
1. In lynx habitat and adjacent shrub-steppe habitats, manage grazing to maintain the composition and structure of native Forest Plant communities.	Forestwide Desired Conditions for Biological Diversity; Forestwide Objectives 2.2, 2.3, 2.5 and 2.7
<b><u>Project Planning - Objectives</u></b>	
1. Manage livestock grazing within riparian areas and willow carrs in lynx habitat to provide conditions for lynx and lynx prey.	Range Guideline 2
2. Maintain or move towards native composition and structure of herbaceous and shrub Forest Plant communities.	Forestwide Desired Conditions for Biological Diversity; Forestwide Objectives 2.2 and 2.7
3. Ensure that ungulate grazing does not impede the development of snowshoe hare habitat in natural or created openings within lynx habitat.	No Forest Plan Guidance (see effects analysis of range management)
<b><u>Project Planning - Standards</u></b>	
1. Do not allow livestock use in openings created by fire or timber harvest that would delay successful regeneration of the shrub and tree components.	No Forest Plan Guidance (see effects analysis of range management)
2. Manage grazing in aspen stands to ensure sprouting and sprout survival sufficient to perpetuate the long-term viability of the clones	Range Standard 2 and Guideline 1
3. Within the elevational ranges that encompass forested lynx habitat, shrub-steppe habitats should be considered as integral to the lynx habitat matrix and should be managed to maintain or achieve mid-seral or higher condition.	Forestwide Desired Condition for Range
4. Within lynx habitat, manage livestock grazing in riparian areas and willow carrs to maintain or achieve mid-seral or later condition to provide cover and forage for lynx prey species.	Range Guideline 2; Riparian Standard 1 -Guidelines 1, 7 and 8
<b><i>Other Human Developments: Oil &amp; Gas Leasing, Mines, Reservoirs, Agriculture</i></b>	
<b><u>Programmatic Planning - Objectives</u></b>	
1. Design developments to minimize impacts on lynx habitat.	Per the CAs, proposed Forest actions are analyzed by LAU to meet this conservation measure.
<b><u>Programmatic Planning - Guidelines</u></b>	
1. Map oil and gas production and transmission facilities, mining activities and facilities, dams, and agricultural lands on public lands and adjacent private lands, in order to address cumulative effects.	Addressed through project-level NEPA analysis.
<b><u>Project Planning - Standards</u></b>	
1. On projects where over-snow access is required, restrict use to designated routes.	Forestwide Objective 3.3
<b><u>Project Planning - Guidelines</u></b>	
1. If activities are proposed in lynx habitat, develop stipulations for limitations on the timing of activities and surface use and occupancy at the leasing stage.	Forest Plan Lease Stipulations do not address lynx. Projects proposed under a lease are subject to NEPA and ESA requirements.
2. Minimize snow compaction when authorizing and monitoring developments.	Per the CAs, proposed Forest actions are analyzed by LAU to meet this conservation measure.
3. Develop a reclamation plan (e.g., road reclamation	Mineral and Energy Resources – General Standard 1

<b>LCAS Conservation Measures (abbreviated)</b>	<b>Rio Grande National Forest Forest Plan Direction</b>
and vegetation rehabilitation) for abandoned well sites and closed mines to restore suitable habitat for lynx.	
4. Close newly constructed roads (built to access mines or leases) in lynx habitat to public access during project activities. Upon project completion, reclaim or obliterate these roads.	No Forest Plan Guidance (see effects analysis of minerals management)
<b>RE: MORTALITY RISK FACTORS</b>	
<b><i>Trapping</i></b>	
<b>Programmatic Planning - Objectives</b>	
1. Reduce incidental harm or capture of lynx during regulated and unregulated trapping activity, and ensure retention of an adequate prey base.	State regulated.
<b>Programmatic Planning – Guidelines</b>	
1. Federal agencies should work cooperatively with States and Tribes to reduce incidental take of lynx related to trapping.	State regulated.
<b><i>Predator Control</i></b>	
<b>Programmatic Planning - Objectives</b>	
1. Reduce incidental harm or capture of lynx during predator control activities, and ensure retention of adequate prey base.	Responsibility of APHIS, consultation underway. APHIS is not responsible for retention of prey base.
<b>Programmatic Planning - Standards</b>	
1. Predator control activities, including trapping or poisoning on domestic livestock allotments on Federal lands within lynx habitat, will be conducted by Wildlife Services personnel in accordance with Service recommendations established through a formal section 7 consultation process.	Responsibility of APHIS, consultation underway
<b><i>Shooting</i></b>	
<b>Programmatic Planning - Objectives</b>	
1. Reduce lynx mortalities related to mistaken identification or illegal shooting	State regulated
<b>Programmatic Planning – Guidelines</b>	
1. Initiate interagency information and education efforts throughout the range of lynx in the contiguous states.	State regulated
2. Federal agencies should work cooperatively with States and Tribes to ensure that important lynx prey are conserved.	State regulated
<b>Competition and Predation – Human Activities</b>	
<b>Programmatic Planning - Objectives</b>	
1. Maintain the natural competitive advantage of lynx in deep snow conditions.	No Forest Plan Guidance
<b>Programmatic Planning - Standards</b>	
1. On Federal lands in lynx habitat, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU. This is intended to apply to dispersed recreation, rather than existing ski areas.	Per the CAs, proposed Forest actions are cumulatively analyzed by LAU to meet this conservation measure.
<b>Highways</b>	
<b>Programmatic Planning - Objectives</b>	
1. Reduce the potential for lynx mortality related to highways.	No Forest Plan Guidance. The Rio Grande National Forest is coordinating with

<b>LCAS Conservation Measures (abbreviated)</b>	<b>Rio Grande National Forest Forest Plan Direction</b>
	CDOT in the consultation process for the Highway 160 improvement project being conducted in the Wolf Creek linkage area.
<b>Programmatic Planning - Standards</b>	
1. Within lynx habitat, identify key linkage areas and potential highway crossing areas	Linkage areas are identified.
<b>Programmatic Planning – Guidelines</b>	
1. Where needed, develop measures such as wildlife fencing and associated underpasses to reduce mortality risk.	No Forest Plan Guidance. The Rio Grande National Forest is coordinating with CDOT in the consultation process for the Highway 160 improvement project being conducted in the Wolf Creek linkage area.
<b>RE: Movement and Dispersal</b>	
<b>Programmatic Planning - Objectives</b>	
1. Maintain and, where necessary and feasible, restore habitat connectivity across forested landscapes.	No Forest Plan Guidance
<b>Programmatic Planning - Standards</b>	
1. Identify key linkage areas that may be important in providing landscape connectivity within and between geographic areas, across all ownerships.	Linkage areas are identified.
2. Develop and implement a plan to protect key linkage areas on Federal lands from activities that would create barriers to movement.	Linkage area plans are to be developed in consultation with FWS.
3. Livestock grazing within shrub-steppe habitats in such areas should be managed to maintain or achieve mid seral or higher condition, to maximize cover and prey availability.	Forestwide Desired Condition for Range
<b>Programmatic Planning – Guidelines</b>	
1. Where feasible, maintain or enhance native plant communities and patterns, and habitat for potential lynx prey, within identified key linkage areas.	Forestwide Desired Conditions for Biodiversity and Forestwide Objectives 2.2 and 2.3
<b>Highways</b>	
<b>Programmatic Planning - Objectives</b>	
1. Ensure that connectivity is maintained across highway rights-of-ways.	Linkage areas have been identified on the Rio Grande National Forest in consideration of risks associated with highways.
<b>Programmatic Planning - Standards</b>	
1. Federal land management agencies will work cooperatively with the Federal Highway Administration and State Departments of Transportation to address the following with lynx geographic areas: a) Identify land corridors necessary to maintain connectivity of lynx habitat b) Map the location of “key linkage areas” where highway crossings may be needed to provide habitat connectivity and reduce mortality of lynx (and other wildlife).	Forestwide Objective 7.4 Linkage areas are identified.
<b>Programmatic Planning – Guidelines</b>	
1. On public lands, management practices will be compatible with providing habitat connectivity.	Forestwide Desired Conditions for Biodiversity and Forestwide Objective 2.4

<b>LCAS Conservation Measures (abbreviated)</b>	<b>Rio Grande National Forest Forest Plan Direction</b>
<b>Project Planning – Standards</b>	
1. Identify, map, and prioritize site-specific locations, using topographic and vegetation features, to determine where highway crossings are needed to reduce highway impacts on lynx and other wildlife.	Linkage areas are identified. The Rio Grande National Forest is coordinating with CDOT in the consultation process for the Highway 160 improvement project being conducted in the Wolf Creek linkage area.
2. Within the range of lynx, complete a biological assessment of all proposed highway projects of federal lands. A land management agency biologist will review and coordinate with highway departments on development of the biological assessment.	Forestwide Objective 7.4 The Rio Grande National Forest is coordinating with CDOT in the consultation process for the Highway 160 improvement project being conducted in the Wolf Creek linkage area.
<b>Project Planning - Guidelines</b>	
1. Dirt and gravel roads traversing lynx habitat (particularly those that could become highways) should not be paved or otherwise upgraded.	No Forest Plan Guidance
<b>Land Ownership</b>	
<b>Programmatic Planning - Objectives</b>	
1. Retain lands in key linkage areas in public ownership.	Real Estate-Land Adjustments Guideline 3
<b>Programmatic Planning - Standards</b>	
1. Identify key linkage areas by management jurisdiction(s) in management plans and prescriptions.	Linkage areas are identified.
<b>Programmatic Planning – Guidelines</b>	
1. In land adjustment programs, identify key linkage areas.	Linkage areas are identified.
<b>Project Planning – Standards</b>	
1. Develop and implement specific management prescriptions to protect/enhance key linkage areas.	Linkage area Forest Plans are to be developed in consultation with FWS.
2. Evaluate proposed land exchanges, land sales, and special use permits for effect on key linkage areas.	No Forest Plan Guidance.
<b>Ski Areas/Large Resorts</b>	
<b>Programmatic Planning - Objectives</b>	
1. When conducting landscape level planning of Federal lands, allocate land uses such that landscape connectivity is maintained.	Forestwide Desired Conditions for Biodiversity; Forestwide Objective 2.4
<b>Programmatic Planning - Standards</b>	
1. Within identified key linkage areas, provide for landscape connectivity.	Forestwide Desired Conditions for Biodiversity; Forestwide Objective 2.4
<b>Project Planning – Standards</b>	
1. When planning new or expanding recreation developments, ensure that connectivity within linkage areas are maintained.	Linkage areas are identified. Per the CAs, proposed Forest actions are analyzed by LAU to meet this conservation measure.
<b>Project Planning – Guidelines</b>	
1. Plan recreational development, and manage recreational and operational uses to provide for lynx movement and to maintain effectiveness of lynx habitat.	Forestwide Desired Conditions for Biodiversity and Forestwide Objective 2.4

While current Forest Plan direction is not specific to the management of lynx and lynx habitat, guidance is provided in a general and permissible manner that would allow the implementation of the related LCAS conservation measures. Forest Plan wildlife standard (10) directs

consistency of Forest Plan guidance, with threatened and endangered species conservation agreements, and provides for the amendment of the Forest Plan to incorporate new direction.

Appendix B of the Forest Service environmental assessment for the Forest Plan revision amendment provides a summary description of activities, and their extent, on the Rio Grande National Forest. Major activities on the Rio Grande National Forest that may impact lynx and their habitat include timber management, fire management, recreation management, livestock management, and travel management. While limited in scope on the Rio Grande National Forest, minerals management activities also may affect lynx. These activities may have specific consequences related to risk factors associated with lynx productivity, mortality and movement, as discussed below.

*Timber Management* - The FEIS predicted an annual harvest level of 11 MMBF/yr, but actual harvest levels have been closer to 7-8 MMBF/yr (EA Appendix B Table B-1). The preponderance of harvest (94 percent) is expected to occur in LTAs 1 and 13 (EA Appendix B Table B-2) and most of that harvest would be in structure class 5 (late successional forest). Depending on harvest method, there would be concomitant increases in earlier structural classes (Table 6 of the BA). The predominant harvest method would be shelterwood cuts or group selection, resulting in an increase in structure class's early successional vegetation and mature forest, with varying size areas and stages of vegetative regeneration.

*Recreation Management* - The Wolf Creek Ski Area is permitted for 1,196 acres, of which 900 acres are fully developed (FEIS page. 3-389). The 1986 Term Special Use Permit was renewed in 1997 with a stipulation that additional construction beyond maintenance of existing improvements would not be authorized without amending the Master Development Plan (MDP). The MDP was updated in 1998 and projects are individually reviewed and consulted as they are proposed for implementation. The ski area falls within the Trout/Handkerchief LAU.

Snowmobiling, cross-country skiing and snowshoeing on and off established roads and trails in lynx habitat result in compacted snow conditions, especially in early winter, where lynx competitors gain an advantage to scarce prey resources. On the Rio Grande National Forest, most snowmobile use is on groomed roads and trails, except for traditional snow play areas. In conjunction with the development of the regional amendment, designated winter use areas have been mapped. Currently, there are 167 miles of groomed routes and 314 miles of designated routes on the Rio Grande National Forest, of which 196 miles are within lynx habitat. Currently, there are 163,803 acres of compacted snow recreation use areas, of which 130,427 acres are within lynx habitat.

*Travel Management* - Approximately 77 percent of the 2,960 miles of Forest Developed Roads (FDRs) are open to public travel, with the balance restricted to timber sale roads. Many of these roads have seasonal restrictions to limit resource damage. Volunteer two-track roads were created before travel restrictions were implemented and continue to be created by unauthorized cross-country travel. These unauthorized roads are generally concentrated in lower elevation, non-forested habitats (FEIS 3-434).

The Rio Grande National Forest has 300 miles of FDRs and 186 miles of "two-tracks" that are causing resource damage or wildlife disturbance and 100 miles of those roads are to be analyzed



for closure. The remaining 300-500 miles of “two-trackers” and low standard roads associated with old timber sales will be inventoried and analyzed for possible addition to the FDRs, closure to motorized travel or total obliteration (FEIS 3-437).

There are 1,500 miles of inventoried Forest Development Trails (FDTs), 65 percent of which are open to all uses, including motorized vehicles. Roadless areas would be managed for both non-motorized (54 percent) and motorized (46 percent) recreation that is restricted to existing trails (FEIS page 3-359). There are an estimated 3 miles of new trail construction, 20 miles of existing trail reconstruction, 6 miles of trail obliteration and 240 miles of trail maintenance (FEIS page 3-440).

*Grazing Management* – Range-wide, under present management practices, the Rio Grande National Forest produces forage in excess of current levels of livestock and big game consumption, providing for plant health, vigor, and regrowth (FEIS page 3-187). However, approximately 32 percent of suitable rangelands are in unsatisfactory condition (FEIS page 3-189 Table 3-46), a circumstance exacerbated in some riparian, ponderosa pine and winter range areas by past uncontrolled grazing, resulting in reduced vegetative productivity, destabilized stream banks and degraded wildlife habitat (FEIS page 3-188).

*Minerals Management* - Minerals management includes activities for development of leasable minerals, locatable minerals and salable minerals. These activities are predicted to be very limited in extent, but may occur within lynx habitat. The Rio Grande National Forest anticipates that a total of 219 acres of habitat may be affected by minerals management from hard rock mining (40 acres), oil and gas exploration and development (129 acres), oil and gas prospecting (40 acres), and salable minerals 10 acres). Forty-six percent of the Rio Grande National Forest land base is considered to have high oil and gas potential, but only 129 acres are anticipated to be disturbed through exploration and development (FEIS page 3-310 Table 3-64). Permitting for salable minerals is discretionary. There are existing sites for Forest Service rock-crushing operations, but no new rock-crushing sites are anticipated.

The Colorado Department of Transportation (CDOT) has initiated a multi-year road improvement project within the Wolf Creek linkage area. Within the project area, lynx mortality due to vehicle collisions has occurred and adverse impacts are expected to lynx habitat from the project. Consistent with Forest Plan direction, the Rio Grande National Forest is cooperating with CDOT to evaluate the project's effects to Forest resources, to identify potential mitigation and to facilitate required consultation.

## **EFFECTS OF THE ACTION**

### **Direct and Indirect Effects**

*Timber Management* - Timber management activities are expected to result in positive, negative, or neutral effects to prey species, and therefore lynx, depending on the manner in which the vegetation is treated. In general, the Service anticipates that most vegetation management activities will have some initial negative effect to lynx, through reduction in habitat quality or removal of vegetation, which will result in lower prey population densities. These actions will result in relatively short-term negative effects, but may result in longer-term positive effects to

lynx. Reduction of large diameter woody debris may affect the survival of lynx kittens and availability of lynx prey. Pre-commercial thinning may reduce the quality and quantity of snowshoe hare foraging habitat and escape cover. Harvest treatments can affect the spatial arrangement of foraging and denning habitat, affecting reproductive success. Road construction may result in increased habitat fragmentation (impeding lynx dispersal), increased human access (disturbing lynx), and increased snow compaction (increasing inter-specific competition).

Under either past budget experience, or full budget projections regarding timber management related road building, additional roads would increase disturbance from harvest activities and subsequent recreational use, such as hunting and snowmobiling. Snow compaction may occur, possibly increasing inter-specific competition from other predators. Road (re) construction would be considered as part of any proposed harvest prescription and would be evaluated, mitigated and consulted at the project level.

Based on implementation of the Forest Plan to date, the experienced budget level portrays a more realistic projection of expected changes to late successional forested habitats. Should this remain consistent throughout the life of the Forest Plan, timber harvest is projected to have a relatively modest influence on the overall ecological composition, structure and processes characteristic of the affected LTAs, and therefore lynx and their habitat.

*Wildfire Management* - Prescribed fire and wildfire may occur in lynx habitat. Anticipated impacts on lynx habitat from prescribed fire could be reduction in denning habitat by removal of dead and down woody material, and a temporary reduction in snowshoe hare habitat. Prescribed fire in some areas may promote regeneration of prey species habitat, although depending on fire intervals, habitat may be burned earlier or more frequently than desirable to achieve winter foraging habitat condition. Since intense burns would not be implemented, most of the woody vegetation and coarse woody debris would remain and continue to provide denning and winter foraging habitat. Fire exclusion may alter the natural mosaic of forest successional stages necessary for maintaining snowshoe hare habitat. Creation of fuel breaks on ridges eliminates cover and may discourage lynx use.

Wildfires would have more extensive impacts to lynx habitat than prescribed fires since they would probably be stand-replacing fires, and occur mostly in spruce-fir and lodgepole pine forests. Impacts to most lynx habitat components would result, most likely converting suitable lynx habitat to an unsuitable condition, eliminating denning habitat for an extended period of time by the reduction of dead and down woody material, and eliminating prey habitat (especially snowshoe hare and red squirrel) in the short to long term. The 2002 "Million Fire" burned approximately 10,000 acres within the Trout-Handkerchief LAU and an estimated 3,500 acres of lynx habitat was converted to unsuitable (Table 7, BA). These estimates need to be ground-truthed, but are not expected to change substantially.

While it remains below the 30 percent cap defined by the LCAS, the estimate of effects to the Trout- Handkerchief LAU makes it the highest percentage of currently unsuitable acres of lynx habitat on the Forest. Moderate to heavily burned areas will not provide habitat for lynx or its prey species until vegetative regeneration begins to establish foraging habitat.

Mechanical treatments to decrease fuel loads and reduce the risk of catastrophic fires also are expected to occur. Anticipated effects will depend on the treatment. Coarse woody debris removal reduces cover for small mammals, as well as possible denning sites for lynx. Removal of vegetation will result in the reduction of horizontal cover and forage for snowshoe hares. Thinning activities result in reduced horizontal cover, and foraging habitat for snowshoe hares as well as alternative prey. As with other fuels management actions, the effects of mechanical treatments will depend on specific action taken, but will generally result in lower quality habitat conditions for lynx.

*Recreation Management* - Recreational developments may have minor impacts on lynx habitat and habitat use. These developments are usually small, existing inclusions within lynx habitat, so actual impacts to habitat are limited. Recreational use and routine maintenance of these developments may disturb any lynx using the surrounding areas, but this disturbance would generally be minimal. Human presence in denning habitat during May through August may result in increased lynx disturbance. In winter, human use of forest roads and trails can increase snow compaction. High-intensity recreational use areas, such as ski areas, may provide a level of disturbance that effectively precludes lynx use (at least temporarily) of otherwise suitable habitat.

Snowmobiling, cross-country skiing, and snowshoeing results in compacted snow conditions within lynx habitats. Current Forest Plan direction allows snowmobiles off Forest roads and trails, which could result in increased snow compaction as recreational demands increase. However, under the CA, and following the LCAS conservation measure, to allow no net-increase in snow compaction, increases in groomed and designated over the snow trails are effectively limited. Individuals and families would not be restricted from using new areas or routes currently open to winter motorized use, but grooming or designation of new routes would be restricted. New authorizations or expansion of existing outfitter operations or issuance of permits would be limited to existing authorized groomed and designated routes and areas. Under the CA, the Service does not anticipate increases in compacted snow conditions resulting from requests for grooming or designation of new routes.

*Travel Management* - Motorized and non-motorized access increases human presence, which may be detrimental to lynx (disturbance; hunting and trapping vulnerability). Snow compaction may provide increased access for lynx predators and /or competitors. Highways, especially within linkage areas, can impede lynx movements and may result in direct mortalities due to vehicular collisions. On the Rio Grande National Forest, a significant highway upgrade construction project is in progress on Highway 160, within the Wolf Creek Pass linkage area. Project effects to lynx as a result of this action were evaluated through consultation with CDOT.

Overall, the BA predicts a net reduction in miles of road and trails, as road and trail construction is expected to be offset by road and trail closure and/or obliteration. The BA did not quantify either new road construction, road closure, obliteration, or rehabilitation. Without some specificity with regard to net changes in roads, it is difficult to assess the net effect of overall action anticipated by the Rio Grande National Forest. New road construction will likely have negative effects described above, and although existing road closures or obliteration may result in some benefit to lynx, those effects cannot be determined at this time. The assumption that there will be a net reduction in overall miles of roads is projected over the remaining life of the

plan. Actions resulting in new roads, and/or road obliteration may not occur concurrently at the project level. Therefore we must assume that both positive and negative effects to lynx are likely to occur over the life of the plan. The presence and use of roads and trails provides increased opportunities for accidental road kills as well as increased lynx vulnerability to snowmobile collision. Roads and trails also may provide travelways for competitors, as there is a chance that winter motorized use will compact snow. Road closure may reduce some level of effect, and obliteration may result in the return of native plant communities, however there may be significant time lag for vegetation to return to a natural state.

*Grazing Management* - Improved management targeted to these areas and implementation of the Forest Plan's range and riparian standards and guidelines are expected to improve rangeland conditions overall. Affected riparian areas are of specific concern to the Forest, and best management practices for soil and water resources will be used to restore and maintain riparian areas as functional ecosystems (FEIS 3-193). Grazing may impact microsites such as high elevation riparian meadows and willow communities, thus reducing snowshoe hare habitat.

Livestock grazing that occurs within lynx habitat has the potential of impacting habitats utilized by snowshoe hare by possibly reducing the shrub component, especially within riparian zones. Improvement of snowshoe hare habitat may be limited in newly created openings from fire or timber harvest, if grazing is not managed for vegetative regeneration to achieve mid-seral or higher conditions.

Specific range management needs are addressed through AMPs, grazing permits and AOIs. Management will apply combinations of requirements for stubble height, stream bank stability, vegetative seral stage and rest to achieve proper functioning condition of riparian systems. Removal or exclusion of livestock from newly created openings due to fire or timber harvest may be required to allow rangeland recovery to occur (FEIS pages 3-196 and 3-197).

*Minerals Management* - Oil and gas developments and surface mining can degrade habitat and increase human disturbances within a lynx home range. Leases and their proposed actions are subject to NEPA and ESA requirements and project level mitigation would be applied, consistent with Forest Plan standards and guidelines and the LCAS. The Rio Grande National Forest has anticipated that 219 acres of habitat may be disturbed by these actions. However, the Forest did not predict acreages of lynx habitat that could be affected. These actions may result in disturbance to lynx denning in these areas because of increased activities at the development sites and their associated roads. Snow on the roads may become compacted, allowing lynx competitors into lynx habitats. No increases in motorized winter use by recreationists are anticipated. None of the Forest Plan's lease stipulations specifically address lynx needs, but development effects associated with mineral activities would be mitigated during project implementation and affected areas would be reclaimed after project completion. Roads used for oil and gas development are single-use roads, would not be used for other purposes during the activity, and most would be abandoned and reclaimed after use (FEIS page 3-308).

Twelve percent of the Rio Grande National Forest land base is considered to have high locatable mineral potential. On an average basis of administering 4 operating plans annually, the estimated extent of activities is 40 operating plans and 4 new miles of road, affecting a total of 40 acres (included in 219 acre total) on the Forest (FEIS page 3-322). The Forest can regulate

and control access to mineral claims, and operating plans are subject to NEPA and ESA requirements, allowing for inclusion of appropriate mitigation at the project level, such as reclamation and protective measures for threatened and endangered species (TES). Requests for recreational mineral collection are evaluated, inclusive of TES considerations, to determine the need for an operating plan. Impacts to lynx from these activities would be localized, but still may negatively affect lynx through site and road development, if near denning sites.

One new rock quarry could be developed and would be subject to NEPA and ESA requirements. Since no proposal currently exists, specific details related to size, scale, and scope of such an action couldn't be determined at this time. A few personal use permits are issued annually, generally for landscape rocks (FEIS page 3-326). Impacts to lynx from these activities are considered negligible, since habitat disturbance would not likely occur.

*Management Indicator Species* - Any incremental changes of effect to lynx would be derived from the proposed additional standards and guidelines and the revised monitoring plan. The specific changes that would occur as a result of the amendment (EA Appendix A) are cross-walked to the LCAS in Table 9 of the BA. The changes are expected to be beneficial, as the amendment would provide more protective measures through additional standards and guidelines and more targeted monitoring of mature to late successional spruce fir and mixed conifer, and riparian habitat types.

Although the proposed action provides more protective measures through additional standards and guidelines and more targeted monitoring of mature to late successional spruce fir and mixed conifer, and riparian habitat types, it will still require site and project specific measures to ensure project actions do not result in adverse effects to lynx, or that the impacts of adverse effects are minimized.

#### Effects of Interrelated or Interdependent Actions

The Service recognizes that future actions permitted under the Forest Plan are interrelated and/or interdependent to the proposed action (amendment). Since specific individual actions have not been identified at this time, their effects cannot be determined. There are actions related to Rio Grande National Forest activities on adjacent Federal jurisdictions, as well as both State and private actions, that may impact lynx habitats where management boundaries overlap LAUs, or linkage areas associated with the Rio Grande National Forest. These actions may have management implications for the Rio Grande National Forest due to conservation standards and guidelines of the LCAS (Ruediger et al. 2000).

### **CUMULATIVE EFFECTS**

Cumulative effects are the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Within the Southern Rocky Mountain Geographic Area (SRMGA), there are large proportions of lynx habitat on non-federal lands where development and/or forestry practices could impact the lynx. Connectivity concerns with highways and development are especially relevant to the more fragmented nature of lynx habitat in the SRMGA. All of the actions may result in some lynx habitat changing from suitable to unsuitable, possibly permanently, reducing dispersal (connectivity) habitat, and increasing the disturbance to any lynx that may be using the areas or adjacent areas.

A private ski village development is proposed in the immediate vicinity of the Wolf Creek Ski Area and access to the private land is across Forest Service lands. A review of the Wolf Creek Ski Area special use permit and its supporting documentation was conducted in 2002 and the report (USDA 2002) recommended the development of a programmatic environmental baseline for a cumulative analysis of effects for both ski facilities. Such an environmental baseline could be developed through NEPA review of the proposed private facility or in conjunction with the development of a Wolf Creek linkage area management plan.

While all of these cumulative actions/impacts may negatively impact lynx and lynx habitat, it is the intent of the Forest Plan to consider these possible non-Forest Service actions within Rio Grande National Forest boundaries, and manage Forest Service lands to mitigate these impacts by implementing Forest Plan direction. Within the boundaries of the Rio Grande National Forest, expected cumulative effects from activities on non-federal lands generally are expected to be insignificant, as total lynx habitat acreages on non-federal lands within most of the Forest's LAUs is <1 percent, as shown in Table 8 in the BA. There are 3 of the LAUs with >1 percent of the total lynx habitat being non-federal. Project specific, cumulative effects analyses will be addressed at the project-level.

Within the Wolf Creek linkage area, some non-federal activities on Forest and adjacent non-federal lands may have localized cumulative impacts of significant scope, and the Forest is working cooperatively with other agencies and private interests to minimize site-specific effects. The Colorado Department of Transportation works directly with the Service to develop project mitigations such as highway underpasses for the Highway 160 improvement construction project, but coordinates with the Forest in the analysis of effects to facilitate project consultation. The Forest also is cooperating with private developers in the preparation of the Environmental Impact Statement for the proposed Village at Wolf Creek. These activities, in conjunction with the existing Wolf Creek Ski Area, could have locally significant cumulative impacts that may best be addressed through a linkage area management plan.

## CONCLUSION

After reviewing the current status of the Canada lynx, the environmental baseline for the action area, the effects of the action, and the cumulative effects, it is the Service's biological opinion that the proposed amendment of MIS to the 1996 Rio Grande National Forest Revised Land and Resource Management Plan, with the commitment to follow the 2000 conservation agreement, is not likely to jeopardize the continued existence of the Canada lynx. No critical habitat has been designated for this species therefore none will be affected.

## INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

Plans are permissive, in that they allow, but do not authorize actions to occur. The BA documents that current Plan language may allow actions that adversely affect lynx. As such, specific actions conducted under the current Plan may impart a level of adverse effect to individual lynx that rises to the level of take. However, the CA substantively reduces the potential for incidental take to occur as a result of actions implemented under the current Plan. The CA requires that all actions be evaluated using the LCAS and Science Report. Projects that comply with the standards and guidelines in the LCAS in most cases would not adversely affect lynx. And therefore no take would be anticipated in most instances. Where Forest Service projects do not comply with standards in the LCAS, and are likely to adversely affect lynx, and do not involve third parties, the Forest Service CA requires that they be deferred until Plans themselves are amended. Therefore, if projects that are likely to adversely affect lynx are deferred, no incidental take is anticipated. For those actions that may result in adverse effects to lynx, we cannot determine, without a project specific description whether the adverse effects would rise to the level of take. Once lynx amendments are completed, actions may go forward.

### Amount or Extent of Take Anticipated

As mentioned above, third parties may propose actions that may result in adverse effects to individual lynx. However, the Rio Grande National Forest cannot anticipate what action may be proposed, when the action may occur, and where the action will occur.

At the broad scale of this consultation (Rio Grande National Forest, and the 4 landscape linkages), the Service is unable to anticipate all possible circumstances that may involve the take of lynx due to actions implemented under the current Plan in conjunction with the CA. The Service therefore conservatively anticipates that some low level of incidental take may occur due to some specific actions implemented under the current Plan in conjunction with the CA. The Service believes that the level of take would be low for reasons including, but not limited to those outlined in the previous paragraphs.

However, the best scientific and commercial information are not sufficient to enable the Service to estimate a specific amount of incidental take, that could result from implementation of the plan, to the species for the following reasons: programmatic plan effects are too broad in scale and difficult to predict to accurately identify specific actions that will result in incidental take; historic population levels of lynx are not well known in the Southern Rockies, and current population levels are changing with the continuation of the State's reintroduction; although most of the lynx that occur in Colorado are detectable in a relatively short time, little is known about how the reintroduced lynx use habitat, or may be affected by actions that impact habitat; mortality data are incomplete, and are changing as the reintroduction proceeds; habitat use in Colorado is generally assumed based on existing literature, and information specific to the reintroduced population is still being developed; take may occur in the form of alteration of habitat; and, up to 19 lynx are not detectable due to the failure of telemetry equipment or other factors associated with attempting to locate these missing individuals.

### Effect of the Take

In this biological opinion, for reasons described earlier, the Service determined that continued implementation of the Plan in conjunction with the CA is not likely to result in jeopardy to the species. Therefore, the Service has determined that, assuming a low level of anticipated incidental take associated with actions implemented under the Plan, and in conjunction with the CA, the plan amendment, as proposed, is not likely to jeopardize the lynx designated population segment (DPS). However, the Service cannot exempt, through this biological opinion, the incidental take of lynx for any action carried out under the direction of the Plan. The Service is unable to anticipate all possible circumstances related to continued implementation of the Plan, including programmatic and individual actions that might be developed in the future. Therefore, incidental take will appropriately be assessed, and coverage under the terms of section 7(b)(4) and section 7(o)(2) of the Act will be granted as appropriate, at the project level during formal consultation.

The CA calls for Plans to be revised or amended considering the LCAS, the Science Report, and the Service's final rule (2000). The Service has concluded that such amendments or revisions would likely not jeopardize the lynx DPS. The conservation measures in the LCAS were intended to conserve the lynx, and reduce or eliminate adverse effects from the spectrum of management activities on Federal lands. The direction provided by the conservation measures would assist Federal agencies in avoiding negative impacts on lynx. Based on the best scientific and commercial information currently available, we believe that Plans that incorporate the conservation measures, and projects that implement them, are generally not expected to have adverse impacts on lynx. Implementation of the measures in the LCAS is expected to lead to the conservation of the species. Revision or amendment of this Plan incorporating the programmatic objectives, programmatic and project level standards and guidelines found in the LCAS, or substantive equivalent thereof, would likely sufficiently minimize the potential for adverse effect and the effects of any take that might occur at the programmatic scale and individual project level. The Service assumes that this plan will be amended, as discussed above, by 2005. Consultations on Plan revision or amendments will necessarily consider any new or otherwise pertinent information not considered in this consultation.



### Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize impacts of incidental take of Canada lynx.

The Rio Grande National Forest shall, through implementation of their existing monitoring plan, include an annual assessment of the effects of actions that affect lynx and/or lynx habitat from actions that have occurred during any calendar year.

### Terms and Conditions

To implement the reasonable and prudent measure, the Rio Grande National Forest shall, on an annual basis, provide the Service with a baseline tracking report for activities that have affected lynx and/or lynx habitat during the course of that year, and their overall impact on lynx management on the Rio Grande National Forest. The report shall be submitted to the Service no later than March 1 of the year following the reported year. Reporting shall be initiated by the Rio Grande National Forest by providing the Service with a report of actions for 2003, with the report being due to the Service by March 1, 2004, and continued in subsequent years. The purpose of the report is to monitor the baseline conditions of the lynx analysis units through time, which will provide a more accurate assessment of the effects of individual actions, as well as provide a tool for the assessment of accumulated effects to the LAU's. The report shall be provided to the Service annually until otherwise notified.

## **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the Act requires Federal Agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

Several conservation recommendations were provided in the October 25, 2000, biological opinion issued by the Service and documented in the consultation history. The Service recommends that the Rio Grande National Forest actively participate in implementing those recommendations as they were presented to the Forest Service as a whole.

## **REINITIATION NOTICE**

This concludes consultation for the potential effects of the proposed Forest Plan Amendment to the Revised Land and Resource Management Plan for the Rio Grande National Forest on the Canada lynx. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: 1) new information reveals effects of the agency or corporate action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, 2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion, or 3) a new species is listed or critical habitat designated that may be affected by the action.

The Service arrived at a non-jeopardy opinion based, in part, on the assumption that the CA would be implemented. The CA commits the Forest Service to ensure that programmatic planning identifies potential impacts to lynx and incorporates conservation measures that reduce or eliminate possible adverse effects to lynx. The reinitiation requirement in the October 25, 2000, biological opinion provides a discussion regarding the continued implementation of the CA. The CA expires in December 2004. At that time, on administrative units with plans that have not been amended or revised to consider the lynx conservation measures in the LCAS, an extension of the CA and continuation of the provision in the CA will be necessary or reinitiation of consultation will need to occur. Amendments and revisions to Plans shall be completed in accordance with the schedule developed as per the direction in the CA, and in coordination with the Service. Should any revisions be made to the CA, such revisions or amendments shall be reviewed and approved in writing by the Service before revisions become effective.

If the Service can be of further assistance, please contact Kurt Broderdorp at the letterhead address or (970) 245-3920 or 243-6209, extension 24.

Sincerely,

/s/ 09/16/03

Susan C. Linner  
Colorado Field Supervisor

cc: FWS/ES, Grand Junction  
FWS/RO/ES, Lakewood (Attn: Bob McCue)  
FS/RO, Lakewood (Attn: Nancy Warren)

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